U. S. Department of the Interior
Bureau of Land Management
Rock Springs District, Wyoming

Sandy Grazing Environmental Statement

FINAL

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SANDY GRAZING ES

VOLUME 2

CHAPTER 9

CONSULTATION AND COORDINATION

The Sandy Grazing Environmental Statement (ES) team was assembled March 30-31, 1976, in the Bureau of Land Management (BLM) Rock Springs District Office. The team consisted of specialists in various disciplines.

PRELIMINARY CONSULTATION

Some consultation efforts preceded the team's assembly. Meetings were held at Rock Springs and Kemmerer during the fall of 1975 with livestock operators in the Sandy area. Operators were notified by letter of the meetings which were intended to explain the background and significance of the environmental statement to the livestock operators as users of national resource lands, including the court action and subsequent agreement (Chapter 1 background section). These informational meetings were followed during the winter of 1975-76 by sessions between the AMP writers and individual users or user groups to determine the future livestock operation plans and needs in the Sandy area.

Draft allotment management plans were completed March 15, 1976, and they were available for review by livestock operators and public interest groups. Livestock operators, the Wyoming Game and Fish Department, and other interest groups reviewed the drafts during the winter and early spring of 1976 and expressed their views on the proposed activity plans.

COORDINATION IN PREPARATION OF THE PROPOSED ACTION

The proposed action as stated in Chapter 1 includes pertinent information from the proposed allotment management plans (AMPs). As previously stated, these plans were prepared after consultations with the Sandy area livestock operators on their future plans and needs in the area.

The AMPs remain unsigned and in draft form until a final decision is made on which of the various proposals for the Sandy area, including the proposed action, mitigating measures to that proposal, and the alternative proposals, will be used in the area. That decision will be made by the Bureau of Land Management after consideration of the environmental impacts that each proposal would have on the area.

Bureau of Reclamation lands administered by BLM are covered in a supplemental memorandum of agreement dated May 22, 1975. Various aspects of land use, resource management, and other activities in the Sandy area are directly or indirectly in memoranda of agreement or understanding between BLM and county, State, and other Federal agencies.

PUBLIC PARTICIPATION

A news release was distributed March 19, 1976, to media throughout the State of Wyoming and the surrounding region announcing public meetings May 10-14, 1976, for the purpose of obtaining public input into the Sandy ES. At the same time, letters and explanatory material were sent to various interest groups and individuals inviting them to take part in the meetings.

Groups contacted by letter at this time included seven wildlife interest groups in the area and state; four educational institutions, including individuals at the University of Wyoming and Western Wyoming College; eight environmental groups; five state and local livestock organizations, in addition to each of the livestock grazing permittees within the Sandy area; five mining and energy firms or organizations; five cultural organizations; seven state or local recreational groups; eighteen city or county governmental agencies, including mayors, city councils, and county commissioners; nine state agencies, including the Office of the Governor and the State of Wyoming Clearinghouse; nine Federal agencies, and fifteen Congressional and State Legislature representatives from the Sandy area and surrounding region.

Livestock operators, the Wyoming Game and Fish Department, and the Sweetwater County Wildlife Association made presentations before the BLM Rock Springs District Multiple Use Advisory Board at its April 1976 session on their reactions to the draft allotment management plans. Opposition to fencing and rotation grazing were the primary topics of discussion, after which the Board passed the following resolution: "The Board expresses extreme concern with the AMPs as proposed and recommends upmost (sic) consideration be given to alternatives; in development of all AMPs, the board feels that minimal use of fences should prevail"

A second news release concerning the May public meetings was issued to district news media and state wire services May 5, 1976, and public service announcements were given to the major radio stations in the area for use on a daily basis.

The five public meetings drew a total attendance of 82 persons. Most oral and written comments received during and after the meetings centered on opposition to

proposed fencing. Many livestock operators also expressed concern that the proposed action would have an adverse effect upon the economics of their operations.

Wildlife concerns were that the fences would hinder animal migration routes, while recreation interests felt fencing would keep them off natural resource lands and also mar the visual resource—the wide, open spaces.

Public Consultation And Coordination

The Sandy Livestock Users Association, which is comprised of about 90% of the livestock operators who use national resource lands in the area, requested and was granted additional time in which to analyze the draft allotment management plans and prepare alternatives to the proposed action. Meetings were held with users during September and October 1976 to develop a users' alternative to the proposed action and during December 1976 to discuss and review the subsequent proposals by the operators.

During the spring and summer of 1976, several presentations were made by the team leader to local organizations, including the Wonderwheelers, Western Wyoming RC&D, and Rock Springs Lions Club, concerning the Sandy area and ES preparation. The team leader also discussed the proposed action with individuals such as James Borzea, president of the Wyoming Wildlife Federation, and Dick Randall of the Defenders of Wildlife and groups such as the Rock Springs District Multiple Use Advisory Board.

District representatives also discussed the proposed action with the University of Wyoming College of Agriculture faculty.

The complete text of all ES-related statements is on file in the Rock Springs District Office.

Further comments are expected from the public through formal statements and informal meetings as the environmental statement is developed. Many individuals with special knowledge and expertise have been consulted during the preparation of portions of the ES, and their input is noted in TABLE 9-1.

COORDINATION WITH OTHER AGENCIES

Ned Frost, State Historic Preservation Officer, and the Denver Regional Office of the Environmental Protection Agency were contacted during the preparation of the Draft Environmental Statement (DES).

Mr. Frost recommended that BLM ask the National Advisory Council on Historic Preservation for its comments on adverse effects of the proposed action and mitigation of those effects under Section 106 of the National Historic Preservation Act (P.L. 89-665) and Executive Order 11593. A 106 statement (see Glossary) covering 35 sites was submitted for review.

Comments on the DES were requested from the following agencies and organizations. Those who provided comments are indicated by an asterisks.

Federal Agencies

Department of the Interior
- *Geological Survey
- *Fish and Wildlife Service
- Bureau of Reclamation
- *National Park Service
- *Heritage Conservation and Recreation Service

Department of Agriculture
- *Forest Service
- *Soil Conservation Service

*Environmental Protection Agency
*Advisory Council on Historic Preservation

State Agencies

*Office of the Governor

*Planning Coordinator's Office—State Clearing House (Distributes to State Agencies)

Local Government

*Sweetwater, Lincoln, Sublette, and Fremont County Commissioners and Planning and Zoning Commissions

Other Organizations

*American Horse Protection Association
Audubon Society
Council for Agricultural Science and Technology (CAST)

*Defenders of Wildlife
Friends of the Earth
*International Society for the Protection of Mustangs and Burros
*Izaak Walton League
National Wild Horse Association
National Wildlife Federation
Natural Resource Defense Council
Northern Rockies Foundation
*Old West Steering E.I.S. Monitoring Project
Outdoors Unlimited
*Public Lands Council
*Sandy Livestock Users Association
*Sierra Club
Society for Range Management
The Wildlife Society
*University of Wyoming
*Wilderness Society
Wild Horse Organized Assistance
Wyoming Archeological Society
*Wyoming Farm Bureau
Wyoming Historical Society
Wyoming Outdoor Council

TABLE 9-1

CONSULTATIONS WITH AGENCIES, ORGANIZATIONS, AND INDIVIDUALS

	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8
FEDERAL								
Bureau of Outdoor Recreation								
Bureau of Reclamation	I							
Environmental Protection Agency		I						
National Advisory Council for Historic Preservation			C	C				
National Park Service	I							
Soil Conservation Service		I						
U. S. Fish and Wildlife Service	I-C	C	C					
U. S. Forest Service	I-C							
U. S. Geological Survey		C	C		C			
NATIONAL								
National Wildlife Federation	C			C				
Wilderness Society	C	C	C					
STATE								
Game and Fish Department	C	I-C	I-C	I-C			C	I-C
State Conservation Commission		C	C		C			C
State Historic Preservation Officer		C	C	C				
Wyoming Commissioner of Public Lands	C	C						
Wyoming Department of Agriculture	C		C					
Wyoming Recreation Commission	C	C	C					C
Wyoming Land Users Association	C							
Wyoming Wildlife Federation	C							
Wyoming Agricultural Unity Group	C							
University of Wyoming	C	I	C					
Department of Environmental Quality		I						
LOCAL								
Sandy Livestock Users Association	C	C	C					I
Western Wyoming Wonderwheelers	C	C	C					
Dick Randall (Defenders of Wildlife)	C	I	C					
Rock Springs Chamber of Commerce	C	C	C					
Sweetwater County Wildlife Association	C	C	C					
Sweetwater County Historical Society	C	C	C					
Sweetwater County Archeological Society	C	C	C					
John Borzea (Wild Horse Organized Assistance)	C	C	C					
Western Wyoming College		I						

I - Input Received

C - Comment Received

*Wyoming Stock Growers Association
Wyoming Timber Federation
Wyoming Wildlife Federation
*Wyoming Wool Growers Association

PUBLIC COMMENTS AND RESPONSES

Public Comments Period

The public comments period was scheduled to provide the public the opportunity to review and then offer comment on the adequacy of the analysis of impacts of the proposed livestock grazing management plan as presented in the draft environmental statement (DES).

The DES was issued on May 26, 1978. The notice of availability was published in the May 22, 1978, issue of *the Federal Register*. The notice also announced a 45-day public review period ending July 10, 1978, and included an announcement of formal public hearings on the DES to be held in Rock Springs, Wyoming. After publication of the notice of availability, copies of the DES were mailed to Federal, State, and local government agencies and to nongovernment organizations and individuals such as conservation groups and area livestock operators for their review and comments. Copies of the DES were available upon request, and public review copies were available in public libraries and BLM offices throughout Wyoming.

In addition to the *Federal Register* notice, a national news release was made from the Department of the Interior, Washington, D.C., on May 19, 1978, announcing the availability of the draft statement. A similar news release was made on May 22, 1978, from the Wyoming State Office and the Rock Springs District Office, Bureau of Land Management, to news media and interested parties in Colorado, Utah, Wyoming, and other states. Distribution of the Wyoming news release included the following:

Media—44 newspapers, 33 radio stations, 7 television stations, 8 magazines and other periodicals, 2 freelance writers, and 2 wire services in Wyoming; 10 newspapers, 10 radio stations, 4 television stations, 4 magazines and other periodicals, a freelance writer, and a wire service in Colorado; 2 newspapers, 23 radio stations, and 3 television stations in Utah; and 24 news outlets in other states.

Agencies—26 Federal; 36 State of Wyoming; 1 State of Utah; 2 State of Colorado; 4 state agencies in other states; 135 county commissioners, planners, and other county officials in Wyoming; 120 mayors, town councilmen, chambers of commerce, and other local officials in Wyoming; 10 county and local officials in Colorado; and 18 county and local officials in Utah.

Groups—36 environmental organizations, 86 industrial firms, 5 livestock and/or agricultural organizations, and 2 wild horse interest groups.

Other—92 Wyoming state senators and representatives, and the Congressional delegations for Wyoming, Colorado, Utah, Montana, Idaho, and other states.

Requests for an extension of the public review period were received and considered by the Bureau of Land Management, which subsequently extended the review period seven days to July 17, 1978. Those requesting an extension were notified by letter and a news release was issued July 3, 1978, announcing the new public comment deadline.

Approximately 600 copies of the DES were distributed. Copies of this draft environmental statement were made available for public inspection at the locations listed on the following page:

Public Hearings

Formal public hearings were conducted by the Department of Interior at 1:30 and 7 p.m., June 28, 1978, in the East Junior High School Auditorium, Rock Springs. Oral testimony was received from, or on the behalf of, 32 agencies, organizations and individuals, including 2 wild horse organizations, an environmental organization, the State of Wyoming, 23 livestock operations and/or organizations, and 3 other individuals. The hearings were conducted by a Hearing Official, and oral comments were recorded verbatim by a Court Recorder. Written testimony also was received. The Hearings Panel consisted of employees from the Bureau of Land Management, including the Sandy ES Team Leader, Sandy ES Technical Coordinator, and specialists representing the broad categories of soils and hydrology, wildlife, vegetation, and socioeconomic conditions. Copies of the full transcript were made available for public review at the Rock Springs District Office.

Handling and Review Procedures for Public Comments

During the review process, more than 35 letters were received from Federal, State, and local agencies; private organizations such as environmental groups; and interested citizens, such as livestock operators in the area.

All letters and the hearing transcripts have been sent with the final environmental statement (FES) to the Secretary of the Interior and Environmental Protection Agency (EPA). These documents will be available for public inspection at the BLM Rock Springs District Office; the BLM Wyoming State Office, Cheyenne, Wyoming; and BLM Office of Public Affairs, Washington, D.C.

All letters and testimony were reviewed and considered in the preparation of the FES. Substantive comments, those which presented pertinent new information, questioned DES impact analyses or data, or raised issues bearing directly upon the impacts of the implementation of the proposed action or its alternatives upon the environment, were responded to separately.

Each letter received and each person who testified at the hearing was assigned an index number. In the following part of this chapter, substantive comments received are grouped by environmental element (e.g., socioeco-

Coe Library
University of Wyoming
Laramie, Wyoming

Western Wyoming College Library
College Hill
Rock Springs, Wyoming

Rock Springs Public Library
400 C Street
Rock Springs, Wyoming

Carnegie Public Library
177 North Center
Green River, Wyoming

Library
Superior, Wyoming

Teton County Public Library
320 South King Street
Jackson, Wyoming

Library
Big Piney, Wyoming

Sublette County Public Library
40 South Fremont Avenue
Pinedale, Wyoming

Lincoln County Public Library
Court House
Kemmerer, Wyoming

Uinta County Public Library
36 Tenth Street
Evanston, Wyoming

Fremont County Public Library
451 North Second Street
Lander, Wyoming

Laramie County Library
2800 Central Avenue
Cheyenne, Wyoming

Bureau of Land Management
Washington Office of Public Affairs
18th and C Streets
Washington D.C.

Bureau of Land Management
Wyoming State Office
Branch of Records and Data Management
2515 Warren Avenue
Cheyenne, Wyoming

Bureau of Land Management
Rock Springs District Office
Highway 187 North
Rock Springs, Wyoming

Bureau of Land Management
Rawlins District Office
1300 Third Street
Rawlins, Wyoming

Bureau of Land Management
Casper District Office
7 Union Boulevard
Casper, Wyoming

Bureau of Land Management
Worland District Office
1700 Robertson Avenue
Worland, Wyoming

Bureau of Land Management
Pinedale Resource Area
Molyneux Building
Pinedale, Wyoming

Bureau of Land Management
Kemmerer Resource Area
Highway 189, Across From Port of Entry
Kemmerer, Wyoming

Bureau of Land Management
Lander Resource Area
Highway 287 South
Lander, Wyoming

nomic conditions, recreation resources, etc.). The comment was typed verbatim in most cases; these comments are followed by the index number of the agency, organization or person who made the comment. Similar comments received from more than one source have several index numbers identifying the source; these comments were paraphrased wherever possible. The response either identifies that the text of the ES was changed or provides rationale for why the comment did not require a text change. Those comments solely editorial in nature were incorporated within the text of the final ES but were not repeated or responded to in this chapter.

All letters received are printed in APPENDIX 9.

Comments and Responses

Two comments shown below were frequently raised at the hearings and in letters received dealing with management of the checkerboard lands and apparent comparisons made in the ES between the proposed action and the alternatives.

Comment. The Bureau should manage 400 wild horses in the checkerboard area and initiate an exchange of surface land to create blocks of public and private land in the checkerboard area. The Fourth of July Well, located on private land in the checkerboard area, should be included in the Sandy area.

Commentators 11, 37, 38, 45, 17, 30

Responses. The checkerboard area is not part of the Sandy area and, therefore, management of the checkerboard lands is not analyzed in this ES. Management and use of the checkerboard area will be analyzed in the Salt Wells Grazing ES, presently scheduled to be completed in Fiscal Year 1981.

Comment. The alternatives, as a whole, are written in a negative fashion, and they seem to be constantly compared to the proposed action. The alternatives were written in a negative manner to justify the proposed action.

Commentators 29, 40, 11, 41, 44, 54, 15, 55, 31, 14, 24

Response. The seeming comparisons between the alternatives and the Chapter 3 analysis of the DES was not done to draw a comparison between the alternatives and the proposed action. The referrals back to Chapter 3 or to another alternative's analysis were made for two reasons: (1) to reduce the amount of repetition of identifying the same or similar impact and (2) thus reducing the volume of the ES.

Comments and responses which follow appear on the following page. Alternative 4 has been rewritten to more accurately reflect the Sandy livestock operators' proposal and Alternative 7 is a new alternative suggested by several commentators.

Soils

1. *Comment.* . . .it seems to me very difficult, if not almost impossible, to be able to determine the acres and the position of range sites with a fourth order soil survey, and given the lack of third order soil survey, which I understand is the data base for determining range site, then it would be almost impossible to have too much faith in projections of range conditions and range trend down the line, if not the existing stocking rate.

Commentator 40

Response. The fourth-order soils inventory and the vegetation range survey map overlays were combined, revealing a close correlation between soils and vegetation. Based on this correlation and extensive field observations, it was possible to determine range sites. Where discrepancies did exist, the best judgment of the Range Conservationist and Soil Scientist were used, and occasional trips to the field were required to determine the sites.

2. *Comment.* Now, what is the basis for all that increased forage, those keen things on stream stability, improvement in sheet erosion, that is to say, reduction in sheet erosion. It is basically geared to this management system. Where do we find this analysis in this statement. We don't. We don't find the analysis in this statement. We don't find the analysis that leads us from this system to the assumptions.

Commentator 41

Response. The reduction in sheet erosion, increase in stream stability, and increased forage are based on the analysis and literature cited found in Chapter 3 Vegetation, Impact of Grazing Systems, of the FES.

3. *Comment.* Contrary to the predicted sediment decrease from the proposed action, we believe that the change from sheep to cattle and the increased AUM's will result in increased erosion and salt loading.

Commentator 20

Response. Sandy area-wide studies indicate only a 1% increase in channel stability (FES Chapter 3, Water Resources, Water Quality). This conclusion was made after evaluating cattle grazing intensity, length of rest in each pasture, and channel stability improvement potential. Not all allotments would experience an increase; the 1% increase is an average of all allotments. Allotments which would experience a decrease in channel stability (TABLE 3-12 of the FES) also would experience an increase in sedimentation and salt loading. It must be remembered that not all allotments would be converted from sheep to cattle and different grazing systems would be applied. As a result, channel stability would vary from allotment to allotment, as illustrated in the FES, Chapter 3 Water Resources, Water Quality.

Individuals Testifying at the Hearing

Comments were received in the Public Hearings June 28, 1978, from the following:

Index Number	Name	Representing
37	John C. Borzea	International Assocation for the Protection of Wild Horses and Burros
38	Kathy Monroe	Wild Horses Yes
39	Gordon Kearl	Self
40	Dick Loper	Old West Regional Commission Range E.I.S. Monitoring Project
41	Calvin E. Ragsdale	Walter C. Yose William P. Mau Warren J. Burke John B. Erramouspe John Longfellow (Livestock Operators)
42	Dick Hartman	Governor, Ed Herschler, State of Wyoming
43	Jessie Baker	Wyoming Woolgrowers Association
44	William J. Thoman Sr.	Wyoming Farm Bureau Federation
45	Glenda Borzea	Self
46	Calvin E. Ragsdale	Robert W. Campbell Kenneth Fleenor Kenneth Fear Ellen Richie and Sons Frank C. Mayo Marvin Mendenhall Livestock Operators and Sandy Livestock Users Association
47	William J. Thoman Sr.	Livestock Operator - self
48	Leonard Hay	Livestock Operator - self
49	Truman Julian	Julian Land and Livestock Company
50	James H. Magagna	Livestock Operator - self
51	William R. Taliaferro	Livestock Operator - self
52	Jim June	Wyoming Game and Fish Department
53	Calvin E. Ragsdale	Self
54	Laney Hicks	Wyoming Chapter - Sierra Club
55	Jim Borzea	Sweetwater County Wildlife Association

Letters Received

All letters received were assigned an index number and are listed below. Editorial comments were considered in preparation of the FES. Substantive comments were responded to in the subsequent comment and response portion of this chapter and the FES text was revised as necessary.

Index Number	Agency, Organization or Individual
1	Sandy Livestock Users Association
2	Oil and Gas Conservation Commission
3	Sweetwater County Planning and Zoning Commission
4	Agricultural Extension Service
5	Rev. Floyd Schwieger, Lander, Wyoming
6	Advisory Council on Historic Preservation
7	Izaak Walton League of America
8	Water Resources Research Institute
9	University of Wyoming, Division of Agricultural Economics
10	Geological Survey, USDI
11	International Society for Protection of Mustangs and Burros
12	James R. Wolf, Rockville, Maryland
13	Stonefly Society of the Wasatch Fly Fishing Club
14	Board of County Commissioners, Sweetwater County
15	Sweetwater County Wildlife Association
16	Midland-Dunton Sheep Company
17	Richard Miller, Laramie, Wyoming
18	Frank Ranches, Inc.
19	Robert D. Dorn, Cheyenne, Wyoming
20	Trout Unlimited National Headquarters
21	The Wilderness Society
22	John C. Borzea, Green River, Wyoming
23	Heritage Conservation and Recreation Service, USDI
24	Sweetwater County Farm Bureau
25	Wyoming Stock Growers Association
26	U.S. Environmental Protection Agency
27	U.S. Fish and Wildlife Service
28	John T. Radosevich, Farson, Wyoming
29	Old West Grazing E.I.S. Monitoring Project
30	Defenders of Wildlife
31	Governor of Wyoming, Ed Herschler, State Clearinghouse
32	Riverside Livestock
33	Joy Call, Point of Rocks, Wyoming
34	National Park Service, USDI
35	Soil Conservation Service, USDA
36	U.S. Forest Service, USDA
36a	American Horse Protection Association, Washington

4. *Comment.* "To decrease soil erosion.." (page 1-3 of the DES). The ES figures on erosion seem large though the region is arid and semi arid (sic) and I would expect natural erosion tobe (sic) significant. I failed to find, however, a clear breakdown of erosion—irrigation, stream bank (sic), storms, and so forth. Instead, I find another blanket formula has been used that may not really represent the actual situation. Again, I can't buy this type of generalization as a basis of what is happening now or what can be expected in the future.

Commentator 54

Response. Erosion has been broken down into geologic (natural), sheet, and streambank classifications (addressed in Chapter 2 Water Resources under Channel Stability and quantified in TABLE 2-12 of the FES). Erosion caused by irrigation was not addressed because it involves less than 0.5% of the Sandy area and there is no information available regarding erosion potential resulting from irrigation.

5. *Comment.* The Musgrave Equation used to measure erosion rates seems to be based on averaging things out and I wonder how valid that is. Improved stream water quality is also based on expectation of increased cover and another formula. Then when I get over to 3-21 (of the DES), I read, "Because studies do not exist in the Sandy area, changes in vegetation production, condition, trend, cover and composition cannot be exactly predicted" What factor of error might be expected then? Is this error factor reflected in the tables? When all this is filtered down with the if's and's and but's, improvements for soil, water and vegetation sound marginal in the ES and dependent on a number of unpredictable factors.

Commentator 54

Response. The introductory paragraph of Chapter 3 Vegetation in the FES notes that the impacts on vegetation are based on professional judgment and cited studies. These studies, although not conducted within the Sandy area, are believed applicable since the findings discuss the results of efforts to meet basic plant needs. Without more specific data, which was not available to the team, a statistically reliable error factor cannot be derived.

6. *Comment. Surface Disturbance* (page 2-12 of the DES), right column—The use of the Mueggler Formula as it is presented in the sited (sic) literature, is improper. Mueggler developed his formula in Montana mountain foothills country, not desert rangelands. He specifically states in the 1965 article sited by BLM in this draft, that his curves and equations are only applicable to Northern Rocky Mountain foothill areas where stocking rates are in the 2—4 AC/AUM catagory (sic). While the same general relationship may hold true between the two ecosystems, the use of the mountain equation coefficients is not proper in view of the fact that the data presented in the draft has been presented as *facts*, not as *assumptions* or *best* guesses *based on existing information*. Recommend BLM qualify the data to reflect its' (sic) potential deficiencies.

Commentator 29

Response. The text in the FES has been revised. See Chapter 2 Soils, Soil Compaction.

7. *Comment. Soil Compaction*, 1st sentence (page 2-12 of the DES)—This statement is presented out of context. Some compaction in light textured soils will increase seed germination of some native species. The statements by Orr are taken from a reference on *bluegrass* rangeland in the Black Hill not representative of native bunchgrass—sage areas. Most bluegrass rangelands are back east, or midwest, in heavier soils than are here. Why can't BLM site soil studies conducted in the west somewhere? They would be more likely to represent our situation.

Commentator 29

Response. The text in the FES has been revised. See Chapter 2 Soils, Soil Compaction.

8. *Comment.* Pg. 8-82 (of the DES). . .Upper right column, 2nd paragraph—It is doubtful that "large" areas of bare ground would result from the construction of reservoirs and water troughs.

Commentator 29

Response. The text in the FES has been revised. See Chapter 8 Alternative 4, Soils, Sheet Erosion.

9. *Comment.* . . .why can't we assume that these *projects would* be maintained so they wouldn't fill up with erosion deposits?

Commentator 29

Response. Unless adequate precautions (fencing and seeding) are taken to assure vegetation will be reestablished on dams, spillways, and sideslopes, erosion would significantly reduce the life of the reservoir. See Chapter 8 Alternative 4, Soils, Sheet Erosion, of the FES.

Water Resources

1. *Comment.* Page A-25, Appendix 2E (of the DES): If the reference cited in Appendix 2E, Smith (1974), was the basis for these calculations, it was not followed completely and there are also some analysis errors. In the following discussion I use the symbols as defined in Appendix 2E. The equations given by Smith are readily verified from texts and handbooks, or by derivation.

Under the Reservoir Evaporation Per Year heading, the assumption of average capacity, or volume when full, of 8.33 ac-ft, an average surface area when full of 2.5 ac, and an average depth when full of 10 ft is consistent with Chapter 1, page 1-30. The side slopes are irrelevant

for a given pyramid configuration when comparing volume or base areas at different levels. Assuming 3.33 ft of evaporation per year, the depth after a year's evaporative loss would be 6.67 ft as shown in Appendix 2E. The calculated area of 2.39 ac after evaporation is incorrect, and should be 1.11 ac. However, this is not needed if the calculation form as given by Smith is used for the volume after evaporation, or

$V_E = (H_E/H)^3V = 2.47$ ac-ft.

Commentator

12

Response. Text in FES has been revised. See APPENDIX 2E, Reservoir Evaporation Per Year and Pit Evaporation Per Year, and Chapter 3 and Chapter 8 Water Resources.

2. *Comment.* For the evaporation per year from each of the reservoirs, 8.33 minus 2.47 = 5.86 ac-ft/yr. This is almost twice the amount shown in Appendix 2E.

Commentator 12

Response. Text in FES has been revised. See APPENDIX 2E.

3. *Comment.* Under the Pit Evaporation Per Year heading (of the DES, Appendix 2E), all results are in error. To be consistent with Chapter 1, page 1-30 (of the DES), I assume the intended parameters are a pit-full volume of 3.42 ac-ft at a depth of 12 ft when full. The side slopes of 4:1 for two sides and 3:1 for two sides as noted in Appendix 2E are necessary to the problem. I assume that sides with equal slopes are opposite each other; otherwise the bottom and midsection areas would be squares rather than the rectangles indicated in the calculations of Appendix 2E.

Commentator 12

Response. Text in FES has been revised. See APPENDIX 2E.

4. *Comment.* The "Existing evaporation rate by reservoirs. . " (page A-25) is not clear in this context. I presume the intent was an average annual evaporation volume per storage facility. If so, a simple arithmetic mean is misleading. There are about twice as many reservoirs as pits in the proposed action, 63 and 33, respectively, noted in Chapter 1 on page 1-30 (of the DES). Some of the alternatives indicate variations from these numbers. The above calculations are estimates of average annual evaporation for reservoirs and for pits. The actual number of each type planned for a particular scheme should be multiplied by the appropriate estimated unit evaporative loss, and then the two amounts combined for the estimate of total evaporative loss for the plan. If an average value for combined unit evaporative loss must be used, it should be a weighted average, or 4.36 ac-ft/yr for the proposed action.

Commentator 12

Response. Text in FES has been revised. See APPENDIX 2E.

5. *Comment.* "There are no new major dams or transbasin diversions to eastern Wyoming that are being actively pursued at this time"(June 1978). There is a possible development being considered for total consumption from the lower Big Sandy River. If this should be developed, stock water could be provided. It is not likely that any other probable major development would have much effect on, or be much affected by, the Sandy Area grazing actions. Localized areas might affect, or be affected by, particular parts of the developments proposed in the ES.

Commentator 12

Response. The text in the FES has been revised, see Chapter 3 Water Resources, Streamflow.

6. *Comment.* "Sediment yield would increase downstream from the proposed reservoirs due to headcutting if the sediment is not removed from them . . " . How would removal of sediment from the reservoirs affect headcutting downstream of the reservoirs?

Commentator 12

Response. Text in the FES has been revised, see Chapter 3 Water Resources, Water Quality.

7. *Comment.* The evaporation amounts used in various places in the Sandy Grazing ES should be corrected. I have noted many of these places in previous comments, but some may have been overlooked.

One point has been ignored in the evaporation treatment. In most years, the reservoirs and pits would be expected to fill, or partially fill, more than once. Thus, the water level would remain higher, a greater surface area would be exposed for evaporation, and the total evaporation would be greater than that indicated by the calculations. This would, admittedly, be difficult to quantify, and might be at least partially offset by failure to fill even once in some years.

Commentator 12

Response. On a year-by-year basis, evaporation losses would not always equal the losses predicted using Smith's methodology (Smith 1974). However, the long-term impacts would approach an average value. Therefore, the use of mean annual evaporation values for predicting long-term impacts was considered more reliable than the establishment of synthetic hydrologic data estimates.

8. *Comment.* Throughout the text, it is an assumption that instream salinity levels are proportional to sediment runoff (see pages 3-16 of the DES). The Southwestern Wyoming 208 study concluded that the salinity contribution from groundwater inflow into streams was quite significant in certain areas of this region. Therefore, the

conclusion that salinity will decrease proportionately with decreasing runoff may be incorrect in certain watersheds.

Commentator 26

Response. Salinity contributed from groundwater would provide a "base level"of salinity for the Green River. The salinity levels discussed throughout the text refer to storm runoff and sedimentation which are above baseflow runoff levels. Therefore, the conclusion that salinity would decrease proportionally with decreasing runoff is correct.

9. *Comment.* Pg. 8-86 (of the DES). . . Fourth paragraph, right column—Why would channel stability generally *decrease* due to increased livestock grazing intensity along streams, when livestock AUMs are not proposed to significantly *increase* in this alternative?

Commentator 29

Response. Livestock AUMs would increase significantly over existing levels because full activation of nonuse (122,260 AUMs, TABLE 8-49 of the FES) is assumed in this alternative and actual use of 86,105 AUMs (TABLE 2-70 of the FES) is used for the existing environment. Channel stability would generally decrease because of increased grazing intensity (TABLE 8-60 of the FES) of this alternative over the existing environment.

10. *Comment.* P. 3-16 (of the DES), *Water Quality* Paragraph 4. Channel stability is proposed to increase by 1% in the Sandy area. This appears to contradict paragraphs 5 and 6 which indicate that channel stability would decrease due to increased livestock grazing intensity along stream channels.

Commentator 31

Response. The paragraphs in the FES following the statement of a 1% increase in channel stability (Chapter 3 Water Quality) refer to decreases in channel stability for specific allotments. TABLE 3-12 of the FES shows the decreases by allotment and the overall increase in channel stability for the Sandy area.

11. *Comment.* Explanation is not given why other factors are not considered in the formula. Some other factors to consider might be climatic conditions, amount of rainfall, amount of instream water flow, intensity of wildlife grazing in the specific area, and recreational use. All factors should be considered when dealing with channel stability. We are concerned that many comments in the draft point out that livestock damage stream channel stability and that appendix 3B (of the DES) indicates that one portion of the formula is "1—Grazing intensity"but nowhere in the EIS is there data to show what impact all ungulates contribute to this situation. Nor does the EIS indicate what the impacts will be from proposed actions. What about wild horse impact? We cannot find any analysis of natural stream channel instability and we believe it is a fact that such does occur.

Commentator 31

Response. The purpose of the Sandy Grazing Environmental Statement is to determine the impacts of livestock grazing on each resource. It is acknowledged that factors such as climatic conditions, rainfall, instream water flow, recreational use, and grazing by other ungulates would affect channel stability. However, for the purposes of the Sandy ES only the impacts of livestock grazing were analyzed.

12. *Comment.* When we refer to Appendix 3B (of the DES)-Methods used in Channel Stability Analysis, we find that this appendix refers to three factors effecting stream channel stability; grazing intensity, length of rest, and improved potential. The devised formulas are not referenced and the constant numbers involved are not explained as to how they fit into the formula or where these numbers were derived from.

Commentator 31

Response. The text in the FES has been revised. See APPENDIX 3B.

13. *Comment.* The need for an integrated approach to salinity control programs requires planning to coordinate and promote actions that will mitigate excessive saline discharges into the streams within the study area. Such controls could be done through:

* Direct action by the state engineer to limit or control the amount of water diverted. This measure may be used to eliminate usage of those streams which have low salinity in favor of preferential use of streams with a high total of dissolved solids. Such utilization of low quality water would allow a higher quality of water to remain instream.

* The restriction or limitation through land use controls on grazing intensity along highly erodible streams should be emphasized to reduce salinity from runoff. Livestock pressures should be mitigated in areas which lack deep-rooted vegetation, until bank stabilization has become effective.

* There should be minimum standards for water well construction to include casing requirements that will provide protection from surface contamination and protection from contamination as a result of interconnecting aquifers of differing quality. The plugging of abandoned wells and exploratory drill holes to avoid contamination of groundwater should be done.

* Eutrophication problems have been observed in Flaming Gorge Reservoir which is downstream from the study area. It would be appropriate to discuss changes in nutrient transport due to the proposed action and the above recommendations.

Commentator 26

Response. It is agreed that the State Engineer should control the amount and quality of water diverted in and above the Sandy area.

Controls on grazing and grazing intensity along highly erodible streams such as stream exclosures and additional water developments are discussed in Chapter 4 under Grazing Systems and Water Developments.

All wells drilled by the BLM are required to be cased as a matter of policy, as discussed in the FES, Chapter 1 Range Improvements, Well Developments. Therefore, interconnection of aquifers will not be a problem.

Nutrient transport would increase with increasing storm runoff and sediment yield. However, the exact amount of nutrients transported (phosphorous, etc.) cannot be quantified because only relative changes in storm runoff and sediment yield were considered. The Sandy area contributes only a small portion of the water received by Flaming Gorge. Therefore, the impacts of any increased nutrient loading would be insignificant.

Vegetation

1. *Comment.* The sections on Threatened and Endangered Plants, pages 2-53 and 3-45 (of the DES), need to be updated and expanded. Other parts of the document will then need to be revised to reflect this updating and expansion.

Commentator 14

Response. The text in the FES has been revised. See Chapter 2 Vegetation, Threatened or Endangered Species; Chapter 3 Vegetation, Threatened or Endangered Species, and Chapter 8, Alternative 1 Vegetation.

2. *Comment.* The claim that rest-rotation management will improve range conditions to that capacity and improve the fishery conditions is highly speculative, extremely doubtful, and not based on factual data. The proposed action plan should include test areas of no grazing, no change in grazing intensity, and increased grazing along stream sections as a guide to future management planning.

Commentator 20

Response. Rest-rotation grazing systems are designed to meet the growth requirements of the vegetation being managed and are based on scientific studies. See Chapter 1, Grazing Systems, in the FES. Monitoring studies as provided in the same section of Chapter 1 would be established to record and analyze changes in the Sandy area including aquatic (riparian) areas and would be used to adjust grazing if the management objectives for a given area are not being obtained. The proposed action did not call for fencing stream habitat areas; but, through impact analysis, the need for both fenced exclosure and study area exclosure was identified. Twenty-six of these areas are proposed to be fenced as discussed in Chapter 4 Grazing Systems, Mitigating Measure 4, of the FES.

3. *Comment.* Trend data is (sic) generally considered necessary before attempting to analyze what, if any, type of maangement plan will be successful. The users would submit that no management plan should be considered until the necessary and proper trend data have been obtained which shows the necessity and desirability of the particular management plan. The environmental impact statement should focus on the potential environmental impacts which might be obtained in adopting plans which do not have underlying relevant factors considered.

A close analysis of the proposed action and of the statement will indicate that the Bureau still does not have the necessary trend data.

Commentators 1, 41

Response. All available trend data were utilized. Acquisition of additional trend data is part of the proposed action. See Chapter 1, Components of the Management Proposal and Grazing System Management, in the FES. The agreement with NRDC necessitated preparing some ESs before acquisition of all desirable data. The reasons for selecting the Sandy area as the first ES in Wyoming is presented in Chapter 1, Background, of the *FES.*

4.Comment. Comments were submitted dealing with the five same general topic-failure of the proposed action to meet the vegetation objectives as stated. The statement does not consider the results of the potential problems of intential overgrazing, unusual weather conditions such as drought, and the impacts of the intensification and concentration of livestock grazing under the rest rotation and other proposed grazing management systems upon the range.

Commentators 1, 41, 54

Response. The vegetation section of the FES Chapter 3 addresses anticipated impacts for each proposed grazing system and grazing treatment, including intensification and concentration of livestock into one-third of an allotment. The impact analysis identified in that section; the Chapter 4 Monitoring Studies; and the provisions for modifying the grazing systems, as deemed necessary through evaluation of the proposed studies (Chapter 1, Components of the Management Proposal and Grazing Systems Management), identify potential failure impacts and provide for actions that would be taken if all or parts of the program fails.

5. *Comment.* "To protect and enhance the vegetation resource.." (page 1-3 of the DES). The ES in my opinion has not convinced me that forage production will increase. The studies cited appear to be on smaller scales and outside our region. The numbers used in the formulas to calculate increased vegetation are generalized data coming from old field work representing different range conditions. Current range trend information is lacking.

Commentator 54

Response. The forage production data were developed using established Bureau procedures outlined in APPENDIX 2I of the FES, and are based on the range survey data. The projected forage increases are estimated utilizing the available range survey data which was field-checked by Bureau personnel in 1975. The reasons for using the studies cited is explained in the introductory paragraph of Chapter 3 Vegetation in the FES.

Current range trend information is not available; thus, an estimate of the apparent trend was made based on an analysis of the available data, observations of the vegetation, and professional judgment.

6. *Comment.* We do not question the technique or methodology behind the 1964-65 ocular reconnaissance range survey, however, we do question the use of 14 year old data for preparing an EIS setting out management guidelines for 2,000,000 acres of land. Was there any sampling done, even small scale, to determine if range conditions have changed in the intervening 14 years? If not, why not?

Commentator 27

Response. During the summer of 1975, range condition transects were run for each vegetation type by allotment in the Sandy area. These data are summarized in Chapter 2, TABLES 2-28 and 2-29, of the FES. These data were the basis for range condition impact analysis in Chapters 3 and 8 Vegetation, Range Condition and Apparent Range Trend, of the FES. The same data were used to determine apparent trend (as discussed in Chapter 2 Vegetation, Apparent Trend of the FES), but long-term studies were not available to determine trend over the fourteen-year period between the ocular reconnaissance range survey and the start of this ES.

7. *Comment.* . . .the draft is deficient in the appendix. It is sometimes very difficult to look at a table and then go to the appendix and try to arrive in your own mind, at least, as to how this information was obtained, although, I am not recommending that we fill this document up with volumes and volumes of supplemental information. If we could have more case allotment examples, from start to finish on a certain subject, it would help us evaluate how we got from one point to another on these AUM projections especially.

Commentator 40

Response. An allotment example was provided where necessary to further explain the methodologies used in the vegetative production data.

8. *Comment.* Forage allocations for wildlife and livestock and under this intensive management will create competition and be detrimental to wildlife and also we feel the livestock within the area, present carrying capacity of livestock and wildlife within the areas is based on 1964-65 sureeys (sic). We feel that these methods are outdated for setting up carrying capacities for these areas at this time.

Commentator 52

Response. The 1964-65 ocular reconnaissance range surveys were the only data available that showed carrying capacity at the time the Sandy ES was written. As new and better data becomes available, it would be used as identified in the Chapter 1 Grazing Systems Management discussion and the Chapter 4 Monitoring Studies discussion of the FES.

9. *Comment.* The statement does not present adequate scientific justification or literature citations for any of the projected desirable results listed for the proposed action and fails to adequately consider the potential adverse results of the proposed action. The cited studies are not applicable to the Sandy area.

Commentators 14, 29

Response. The sections on Implementing and Management Procedures and Grazing Systems in Chapter 1 of the FES make reference to scientific studies which address findings relative to the results of implementing grazing systems. Chapter 3 of the FES presents the predicted beneficial and adverse impacts, and to the extent possible using available data, it presents support for the conclusion drawn in the analysis. The studies cited are not specific to the Sandy area; however, they refer to areas with similar conditions and give a reasonable approximation of the anticipated impacts that could occur.

10. *Comment.* The land managing agencies . . .have not documented elsewhere the performance of grazing systems to give reason for optimism about the effect on livestock. Certainly it is not documented in the Sandy Grazing ES. The effect on sheep is conjectural and doubts fully as warranted as on cattle (sic).

Commentator 9

Response. Since the grazing systems have worked satisfactorily in areas outside the Sandy area, the prediction is made that providing for the same plant needs within the Sandy area would result in similar plant responses. If range condition can be maintained or improved through proper range management, which includes well planned grazing systems, the results should include a positive effect on livestock.

11. *Comment.* This draft is deficient in the Appendix, especially in specific examples which would show the reader how basic resource information from the field was used to build statements and tables of environmental impacts such as present and future AUM's by species, range condition and trend, wildlife population increases or decreases, etc., etc.

Commentator 29

Response. Examples must be held to a practical level in a document such as this. In order to provide examples of all procedures for each table, several volumes would

be required. All of the background and backup material utilized in preparing the statement are available for inspection in the Rock Springs District Office.

12. *Comment.* . . .Appendix 1B (of the DES) is presently deficient. It should show the AUMs *available* for wildlife at the time of the 1964-65 rangeland o. r. survey, the *present* population levels, and the wildlife species AUM *goals*, so comparisons can be made.

Commentator 29

Response. TABLES 1B-1 and 1B-2 of APPENDIX 1B in the FES show the present AUMs available (TABLE 1B-1) in comparison with long term AUM availability (TABLE 1B-2) for wildlife. Present and desired wildlife population levels can be found in the FES, Chapter 2 Wildlife, Terrestrial, TABLES 2-36 and 2-37, respectively. Present AUMs available shown in TABLE 1B-1 of APPENDIX 1B was summarized from TABLE 2-24 in Chapter 2 Vegetation of the FES, showing present vegetation production. The present vegetation production was based on the 1964-65 ocular reconnaissance range survey. AUMs available in the long term are from TABLE 3-15 in Chapter 3 Vegetation of the FES.

13. *Comment.* The entire sentence on the effects *of Treatment A* is an overstatement of the adverse effects of livestock season—long grazing on the resource.

Commentator 29

Response. The text in the FES has been revised. See Summary Page.

14. *Comment.* Why would vegetation production be reduced over the short term due to inital grazing pressure, when fewer AUMs will be allowed? Proper stocking rates will not cause reduced forage production to occur.

Commentator 29

Response. The text in the FES has been revised. See Summary Page.

15. *Comment.* Increased operator maintenance cost is not an environmental effect, and this statement does not belong in this section.

Commentator 29

Response. The text in the FES has been revised. See Summary Page.

16. *Comment.* A change in livestock use *patterns* is not necessarily an adverse environmental impact on the resource.

Commentator 29

Response. The text of the FES has been revised. See Summary Page.

17. *Comment.* It is doubtful that a *trend* can be evaluated in these allotments of Big Sage (sic) is the *key* species, and only receives 15-20% utilization.

Commentator 29

Response. The draft AMPs identified more than one key species. The draft AMPs are available to public review in the Rock Springs District Office. The key species selected (TABLE 1-10) for inclusion in the FES was the plant that livestock movement between pastures will be based on. Trend will not be based on those individual species but will be a measurement of the change in the total plant community. See Glossary of Terms and APPENDIX 2I of the FES.

18. *Comment.* In order to establish vegetal trend, something needs to be known of the climax ecological condition. The myriad of vegetal descriptions given by early travelers such as Townsend show the vegetal trend is definitely improving. Impartial study of these historical documents should be required.

Commentator 31

Response. The development of the ecological range site concept (see Chapter 3 Vegetation; APPENDIX 2I, and Glossary of the FES) which was utilized in various ways in the analysis, considered history in determining climax plant communities for range sites.

19. *Comment.* If the data base for past present and future estimates of carrying capacity are not accurate, then the "improved management systems"are not based on factual information.

Commentator 31

Response. The text in the FES has been revised. See APPENDIX 2I Determination of Potential Forage Production.

20. *Comment.* The determination of range condition trends, more explanation in the appendix would be quite helpful. As I mentioned, the conversion or the termination of range sites, and I think some of the tables in there right now mentioned that, shows a list of range sites and in effect, those aren't really ES range sites, they are BLM keys for range sites, and yet, the appendix doesn't give a key to the key in the table.

Commentator 40

Response. The text in the FES has been revised to include introductory discussions to the various methods for describing distinct areas of rangeland (Chapter 2 Vegetation, APPENDIX 2I, and Glossary) and additional text definitions have been provided. Wherever such terminology was used, it has been reviewed and clarified where necessary. Extensive revisions of table headings and footnotes were made.

Wildlife

1. *Comment.* Trout Unlimited submits that BLM's contention that the stream fishery conditions will improve in the Sandy Area is incredibly naive, especially for a professional agency.

Commentator 20

Response. Chapter 3, Aquatic Wildlife, Summary of Impacts in the FES, identifies that while *some* areas will improve (due to the rest provided in the grazing systems proposed), the overall general trend areawide would continue to decline. TABLES 3-46 and 3-47 further illustrate this conclusion.

2. *Comment.* Inasmuch as sage grouse and numerous other game and nongame species are so dependent upon the meadow type vegetation, we feel that protection of some of these areas is necessary. Although the proposed plan calls for removing livestock from these areas when 70-75% of the forage has been utilized, we feel this is not sufficient for wildlife.

Commentator 27

Response. The impacts on wildlife associated with the predicted 70-75% utilization of the meadow type vegetation are described in Chapter 3, Terrestrial Wildlife of the FES. Chapter 4, Grazing Systems, Mitigating Measure 4 (calling for riparian fencing of 26 individual areas) and Chapter 4, Monitoring Studies, of the FES (calling for exclusion of 20 sites of 1,500 feet x 600 feet around wetlands) would result in a total of 46 individual areas Of public land totalling approximately 375 acres, or 28% of the wet meadow type. The total acreage of wet meadow along flows (around which the bulk of wet meadow occurs) that could be fenced would be approximately 1,300 acres, or 62% of the vegetation type. Text in FES has been revised to include game species. See Chapter 4 Grazing Systems.

3. *Comment. Page 2-96* (of the DES), *2nd column, paragraph* 6 The sentence, "The bald eagles appear to be the northern subspecies which are being nominated for inclusion on the endangered species list"should be reworded, "Bald eagles, which are also present in the area, have been listed as endangered species in Wyoming" This change was listed in the Federal Register, February 14, 1978, Vol. 43, No. 31, and became effective March 16, 1978.

Commentator 27

Response. Text of the FES has been revised. See Chapter 2 Existing Environment, Wildlife, Terrestrial Wildlife, Nongame.

4. *Comment.* An attempt has been made to mitigate the consequences of extensive fencing by proposing three strand instead of four strand fences in some locations. Were let-down fences also considered as a mitigative measure in some areas?

Commentator 27

Response. Yes, let-down panels were considered. However, it was felt that by flying the fences and making emergency modifications as needed (FES Chapter 4 Monitoring Studies, Terrestrial Wildlife), would more adequately mitigate this impact by utilizing a modification to the fence that fits individual situations.

5. *Comment.* In view of the fact that the proposed change in livestock use (sheep to cattle and more intensive management) is generally projected to degrade the riparian systems (see page 3-75 of the DES, 2nd column, 6th paragraph), in some cases accelerating erosion by as much as 1,362 percent (see table 3-43 of the DES), couldn't more attention be given in the mitigation proposals to additional and more widely distributed riparian protection?

Commentator 27

Response. As noted in Chapter 4, Monitoring Studies of the FES, grazing management of the Sandy area would be conducted on the basis of the proposed monitoring studies. Of particular importance would be the monitoring of riparian systems. Adjustments in grazing management would then be made to benefit riparian habitat throughout entire allotments, rather than in just the few protected areas.

6. *Comment.* Similarly, inasmuch as the wet meadow vegetation comprises less than two percent of the entire Sandy Area, shouldn't surveys have been made to determine which of these meadows were most productive of wildlife? Measures could then have been presented in the mitigation chapter of the statement that would protect some portions of the most important meadows.

Commentator 27

Response. All meadows in the Sandy area are important to wildlife. Depending on the species of wildlife, some meadows are more heavily used than others. Importance could be established by species; however, this can also vary from year-to-year. Various meadows, as they occur within habitat delineations (MAPS 2-22, 2-23, 2-24, 2-25 of the FES), also have seasonal degrees of importance. Mitigating Measure 4 and aquatic wildlife and watershed monitoring studies in Chapter 4 of the FES were provided to improve riparian habitat through study exclosures. Data would be analyzed in search of improved management methods from which modification in the proposed action would be initiated to protect the riparian areas.

7. *Comment.* Increased competition will not occur *with all* wildlife species on *all* areas.

Commentator 29

Response. The text in the FES has been revised. See Summary Page.

8. Comment. The statement "Any fences built in the area will cause animal mortality;.." is also incorrect, and very misleading. This statement should be changed to read "The amount of fencing proposed in the Proposed Action will cause some animal mortality;..".

Commentator 29

Response. The significance of this mortality, as related to species, varies as described in Chapter 3, Terrestrial Wildlife, of the FES. The fact that the proposed fencing would cause some animal mortality, supports the above quote from the ES.

9. *Comment.* Were *all* ungulates and wild horses included in this analysis. Page A-61 (of the DES) indicates that ungulates are present and should be considered in stream evaluation—but were *all* ungulates considered?

Commentator 31

Response. In FIGURE 3D-2, of the FES all ungulate bank damage through trampling is noted in the ungulate damage rating. However, under "major problems", cattle were identified to be the primary cause. Where wildlife or horses are causing the problem, it is identified as well.

10. *Comment.* Page 3-84 and 3-85 (of the DES)—Pictures--these pcitures (sic) are not true comparisons, Figure 3-3 and 3-4 are apparently taken after a heavy snow fall which could cause the willows to be packed down and even broken up. Figure 3-5 and 3-6 could have been taken after a very light snow fall to give the snow effect in the photos. After a normal wel (sic) year around normal grazing the willows could have this amount of growth. This is a very poor comparison and cannot be blamed on livestock grazing. Wildlife can and could have caused the same effect on willow growth. Mention should be made in the descriptive paragraph to the effect wildlife and wild horse herds can have on stream banks. Blame should not be attributed to livestock grazing only.

Commentator 31

Response. FIGURES 3-3 and 3-4 of the FES represent the "before grazing"and FIGURES 3-5 and 3-6 of the FES represent the recovery "after grazing". As determined through the field observations, the effects shown in the photos were a result of grazing rather than heavy snow. The purpose of these photos is to illustrate the amount of regrowth and recovery over time after being grazed.

11. *Comment.* Are we to assume that the Figure 3D-3 (of the DES) will apply only to livestock or will *all* ungulate and wild horse grazing be subjected to this apparently complex analysis?

Commentator 31

Response. For the purpose of analysis in this statement, this diagram analyzes the effects of livestock grazing. Some impacts or relationships may be applicable to other ungulates, but this flow diagram does not analyze use other than livestock.

12. *Comment.* The increased livestock use and conversions in this alternative would be the same as those in the proposed action. Comments about activated non-use based on a 1964-65 ocular reconnaissance survey of carrying capacity were made in the discussion of the Proposed Action. They are also applicable to Alternative No. 3.

Conversions from sheep to cattle were discussed in the Proposed Action and those comments are applicable here. Increased cattle use would decrease winter range forage for elk. Provisions should be made to minimize livestock use of winter ranges important to elk (refer to Elk-Part 1).

Commentator 31

Response. The proposed action and all alternatives include reservations for wildlife based on population estimates provided by the Wyoming Game and Fish Department. Chapter 1, Proposed Action, Grazing System Management, of the FES states new and more up-to-data data would be used as it becomes available. If the results of monitoring studies indicate specific objectives are not being achieved or are being exceeded after one complete grazing cycle, modification of the AMPs would be made.

13. *Comment.* On existing deteriorated riparian habitat it is unlikely that one or two years rest from livestock use, followed by one or two years heavy livestock use will be sufficient for shrub reestablishment.

Commentator 31

Response. This fact was brought out within the aquatic analysis in Chapter 3 of the FES. The riparian management and study exclosures proposed in Chapter 4 of the FES are intended to reduce this impact.

14. *Comment.* The effectiveness of mitigating measures was analyzed for the 26 stream miles, but the overall effect from both mitigated and unmitigated portions is not adequately displayed in the FES.

Commentator 31

Response. Chapter 4, Analysis of the Effectiveness, Mitigating Measure 4; TABLE 4-7, Aquatic Wildlife; and Chapter 5, Aquatic Wildlife, discuss these points.

15. *Comment.* The overall resulting condition is still unclear. Much depends on locations and management practices upstream from the enclosures. Additional consideration should be given aquatic/riparian habitat. Inadequate consideration is given to off-site impacts.

Commentator 31

Response. The overall resulting conditions are described in Chapter 5, Aquatic Wildlife, of the FES. The determination of these conditions considered off-site impacts such as sediment yield, runoff, and watershed stability as portrayed in the soils, water resources, and vegetation sections.

16. *Comment.* There is no analysis of the effect of the increased numbers of wildlife on the willows and, thereby, the riparian and aquatic habitat.

Commentator 1

Response. Where the analysis of the proposed action on alternatives in the FES (TABLE 8-115) shows an increase in fish and/or wildlife populations, there is a corresponding decrease in livestock use; therefore, decreasing the competition in the riparian areas (including the aquatic habitat).

The impact from increased wildlife use in riparian areas is not considered significant and has therefore not been specifically addressed. The increased wildlife populations are not considered a significant increase over the present situation except for Alternative 2; therefore, the benefits of less competition in the riparian areas from reduced livestock use would more than compensate for increase in wildlife use.

In Alternative 2, because of the elimination of livestock use, the condition of the riparian areas would improve throughout the Sandy area and could be expected to lead to a wider distribution of big game, spreading out the use and reducing impacts on riparian areas caused by significant increases.

17. *Comment.* Alternative Number Two (of the DES), which is a no-livestock grazing at all. Ig (sic) goes on to say, that wildlife would benefit, including wild horses just greatly, and this would happen for a period of time, but there are many areas where this has been tried, for example, Oregon on their, and I forget the name of the refuge there. It is an antelope refuge where all grazing was disallowed, except for antelope and wildlife grazing. And after the first few years of this type of situation, the population bounded, and after that it started on a downward trend and finally, to bring the animals back, they had to introduce livestock grazing in there to control mainly the grasses, so the shrubs that the antelope liked would come back in.

Commentator 49

Response. Communications with the refuges in Oregon, which are available for review in the Rock Springs District Office, have established that facts and records cannot support the conclusion made in this comment.

18. *Comment.* (A) Additional waters would increase wildlife use on critical wintering habitat resulting in reduction of available forage, contributing to the reduction of the mule deer population in the Sandy area. This is what you were talking about on page 3-57 (of the DES). I don't think this is true. (B) Again, I would like to say, if you pull these domestic livestock out of the main constant winter areas, I think the overall range condition would improve.

Commentator 49

Response. (A) Waters are proposed for development on deer crucial winter habitat resulting in detrimental impacts by promoting removal of forage by livestock and wildlife in the areas crucial to winter survival.

(B) This would not necessarily be true. A grazing system designed to increase shrub cover, particularly on pronghorn, and deer crucial winter habitat, could be expected to improve habitat. It is believed that livestock can be used to improve wildlife habitat by implementing system(s) designed to benefit respective wildlife species.

19. *Comment.* Riparian habitat improvement and maintenance is not adequately considered, and is not considering all phases of wildlife species and livestock. There has been no consideration for the long term vegetative changes that occur under this management program and these changes will vastly change habitats and ecosystems of animal lives within these areas.

Commentator 52

Response. Riparian habitat is referred to as the "meadow, wet meadow, and willow types"in Chapter 3 Vegetation, Impacts of Grazing Systems, of the FES. Riparian habitat is also analyzed in Chapter 3 Vegetation, Impacts of Grazing Systems, Water Development, and Wildlife, terrestrial and aquatic sections, of the FES. Chapter 4, Mitigating Measures, Number 4, identifies twenty-six riparian study areas within nine of the proposed allotments. These studies are intended to determine long-term changes in the riparian habitat and, subsequently, any management adjustments which may be necessary. In addition, Chapter 4 Monitoring Studies, Aquatic Wildlife and Watershed, of the FES identifies twenty riparian management areas to mitigate impacts anticipated to occur on these riparian areas.

20. *Comment.* Alternative One (of the DES),which deals with the present system of management if it were continued, (says) the antelope population would greatly decrease. However, from the type and number of antelope permits issued in the areas involved in the Sandy EIS is over the last few years, I think this statement can be greatly disputed. Permits have been decreased every (year) since the hard winter, and although I can't give you anything on the figures, they are going to have a great jump in 1978.

Commentator 48

Response. The reduction in pronghorn population identified for Alternative 1 would be considered slight during most years—400 animals (less than 4% of the desired population) as identified in Chapter 8 Wildlife, Terrestrial, Pronghorn Antelope, Migration, of the FES.

21. *Comment.* The level of intensive grazing in one pasture could damage a significant portion of the vegetation needed by wildlife that year and cause reduced populations. They might have that area all to themselves the next year but the damage would already be done.

Commentator 54

Response. Chapter 3 Wildlife, Terrestrial, of the FES describes these impacts in detail by species, by allotment.

22. *Comment.* The fencing proposed in the proposed draft, much of it all in the alternatives, could have a very detrimental affect on wildlife species, perhaps contributing to the decimation of antelope herds.

In the Winter of '71 and '72 mortality of antelope ranged from 43 to 75 percent in the Sandy area. With the addition of proposed fences, a similar winter could exceed the 75 percent mortality level.

Commentator 55

Response. Mortality could exceed 75% during a winter as severe as that of 1971-1972 when in conjunction with the degree of fencing in the proposed action (see Chapter 3 Wildlife, Terrestrial of the FES).

23. *Comment.* Most of the proposed 39 wells would not benefit pronghorn from June through Octiber (sic) since they would not be turned on, only when the pasture was being grazed by the livestock.

Commentator 55

Response. This impact would be mitigated through implementation of Mitigating Measure 17 in Chapter 4 of the FES.

24. *Comment.* Water developments have been proposed scattering the livestock over the entire area. Why no concern for critical winter habitat?

Commentator 55

Response. This impact would be mitigated through implementation of Mitigating Measure 17 in Chapter 4 of the FES.

25. *Comment.* The impact of allocating all increased forage production use to livestock appears to be at the expense of wildlife. It would seem appropriate to allocate a portion of the increased AUM's to big game and other wildlife use.

Commentator 35

Response. The text in the FES has been revised. See Chapter 3 Assumptions and Analysis Guidelines, Assumption 5.

26. *Comment.* The proposal states that perigrine (sic) falcon habitat would be improved. This is another fallacy. Riparian zones that provide habitat for waterfowl would be impacted. Fewer shrubs and less sagebrush means fewer sage sparrows and other small birds that provide part of the food source for the perigrine (sic) and for other raptors.

Commentator 30

Response. An anticipated increase of nongame animals would be expected to increase the prey base, thereby increasing the hunting success of peregrine falcons.

27. *Comment.* However, in the analysis on the effectiveness of the mitigating measures (see page 4-10 of the DES) we are told that restricting the livestock use on willows would reduce the moose mortality by 5% by providing ample forage for moose. This gives rise to several questions. If we open the gates to the moose, will not the livestock also enter? If we only open the gates when livestock are not around, are not the moose and livestock competing more heavily in the areas not fenced? Is there an offsetting increase in intensity of use of the non-fenced areas which militates (sic) against the assumed improvements in the fenced areas? Do not moose cause the same effects on riparian and aquatic habitat as livestock? Where is the analysis concerning moose effects on the riparian and aquatic habitat?

Commentator 1

Response. Gates would not be opened for moose; the Proposed Action fences would be constructed relative to Mitigating Measure 2, Chapter 4 of the FES, to avoid injury to moose crossing fences. Livestock would be competing less with moose by distributing their use beyond riparian zones. Fences are to preclude livestock use in riparian areas by forcing their use of peripheral areas. Damage would be expected to be similar, but to a lesser degree, since moose are less restricted, less numerous, and usually occur in ones and twos rather than in general herd associations.

28. *Comment.* . . .the critical factor of why you find wild animals where they are is the climatic conditions, more so then the forage conditions. A strict rotation system in a critical wildlife wintering area, I think you would have problems with it in that when you come in there, whether it was grazing year around or you were thinning all your animals while you was resting another area in this area, I think you would do more harm then (sic) good as far as the wildlife wintering areas, because they cannot move to the other areas because of climatic conditions.

Commentator 49

Response. Climate is certainly an overriding factor in where animals are located. The changes in populations of big game species on the Sandy area would primarily be affected by forage availability during critical winter and spring periods identified in Chapter 2 Wildlife, Terrestrial, and Chapter 3 Wildlife, Terrestrial, Assumption, of the FES.

Maintenance of wildlife food and cover was built into the grazing systems in Chapter 1, TABLES 1-4 and 1-8, of the FES. The impact analysis of forage production relative to availability on crucial winter habitat is shown in the FES, Chapter 3 Wildlife, Terrestrial, for big game species.

29. *Comment.* The statement "Grazing systems designed to increase livestock use would lead to reduced numbers of wildlife" is incorrect, very misleading, and represents a narrow-minded, uneducated point of view. A basic philosophy in the Profession of Rangeland Management is that livestock are one of the few *manageable* tools we have in order to manage the resource for improved *multiple* use benefits. A properly designed grazing system will provide forage for *all* grazing uses. A system properly designed to increase livestock use must also be increasing forage availability and/or quantity on the land. Many wildlife species will also benefit from this improved situation.

Commentator 29

Response. This comment refers to a concern expressed when the MFP decisions were being developed. This concern was addressed when the AMPs were developed. Forage reservation for wildlife were provided in Chapter 1 and analyzed in Chapter 3 of the FES. See Chapter 1 Implementation of Management Procedures and Chapter 3 Wildlife, Terrestrial, Habitat, of the FES for each big game species.

30. *Comment.* In addition to food, there would be competition for space. As it was pointed out, . . .no regard (was given)to private land anywhere in the area, and much of the game use in this area is on private land by wildlife and horses. If the ranchers were denied the use of the public land or kicked off of it, this would hurt areas, for example, the antelope winter population, where there aren't many animals wintering on private ground, because that would put more pressure, if he could get by without the public domain, to fully utilize his private ground.

Commentator 49

Response. The grazing systems of the proposed action are anticipated to benefit wildlife, regardless of management practices on private land. Although, wildlife crucial winter habitat shown on MAPS 2-22 through 2-25 of the FES contains some private land, the majority of the crucial winter habitat exists on other lands within the Sandy area.

31. *Comment.* Proposed fencing will decrease the ability of the habitat to maintain desired big game populations. Presently, the Sandy is fenced on a low-scale. The 536 miles of proposed fencing will be nearly twice the current fencing. This is fencing on a large-scale. Fencing which bisects migration routes and/or critical winter range will adversely affect winter antelope distribution. Shrub composition on critical winter yearlong ranges utilized by sagebrush-dependent native wildlife will decrease under prescribed grazing treatments. Distribution of wildlife and wildlife habitat will be altered due to changes in forage availability and plant composition. There will be a decrease in carrying for sagebrush-dependent wildlife. In areas such as the Little Colorado Desert, where pasture fences bisect antelope winter range, the adverse affects of decreased shrub composition, direct fence mortality and altered distribution to low-quality winter range will be massive due to the cumulative effect of existing fences and those proposed (refer to Antelope Habitat-Part I). Grazing systems employing fenced pastures on elk or deer winter range may result in excessive livestock use of elk or deer winter forage, especially in the Sandy where systems are designed to accommodate livestock needs and not wildlife. For example, the Little Sandy-Little Prospect Allotment pasture system was divided so that it will not rest at least half of the critical elk and deer range each year. In the Bush Rim, Pacific Creek, Sands, and Steamboat Allotments, provision for critical elk winter range was not designed into the system.

Commentator 31

Response. These concerns are considered in the FES, Chapter 1 Interrelationships, wildlife section. Draft wildlife habitat management plans were prepared as input to the development of the AMPs, which considered improvement and maintenance of wildlife food cover, distribution, and safety in the design of all proposed fences. The fence locations in the rest-rotation allotments were specifically designed to divide the crucial habitat between pastures, therefore reducing the stress on the crucial habitat.

Wild Horses

1. *Comment.* 1) I feel that it is important that more than just sufficient water be provided for the horses. When water is limited, horses concentrate around water, and competition with livestock and impact on vegetation is increased. When ample water is available horses generally drink their fill within three minutes and return to grazing areas distant from water. If water is limited the horses spend most of their time within one mile of water. I suggest three alternative management plans: 1) build a well north of the checkerboard in S. 16, R. 100 W. T. 23 N. before fencing, 2) remove all the horses that use Fourth of July well before fencing, or 3) trade the private land owner for Section 21, R. 100 W., T. 23 N. and the quarter section of Section 15, R. 100 W., T. 23 N. which is now private.

Commentator 17

Response. Sufficient water implies there would be more than limited water for the horses. It is noted in Chapter 1 Range Improvements of the FES that wells would be maintained for the benefit of wild horses. MAP

1-5 indicates a proposed well in S. 30, T. 24 N., R. 100 W. which should provide sufficient permanent water to horses in the vicinity of S. 16, T. 23 N., R. 100 W., four to five miles away. Points 2 and 3 concern areas not covered by this FES. A general response related to the management and rise of checkerboard lands is provided at the start of the comments and response section.

2. *Comment.* I suggest that the proposed number of horses in the Little Colorado Unit be raised by 100 animals. I believe that the minimum population which can be sustained without significant inbreeding is approximately 100 animals. Since it cannot be predicted with accuracy if groups of horses in the Little Colorado Unit would exchange members and since the estimates of minimum numbers may be off, it would be better to have a few over the minimum breeding population rather than a few under the necessary number.

I feel that the possibility exists for a large horse die-off if the horses are fenced off from water before other water is provided or the horses are removed.

Commentator 17

Response. As stated in the FES, Chapter 1 Interrelationships and Chapter 3 Wild Horses, the population level in the Little Colorado Wild Horse Management Area would be 150 horses. TABLE 3-48 shows the range in the population would be from 100 to 200 head of horses at any given time. This should insure an adequate gene pool. Provisions would be made to provide water for horses before fences that would affect them are constructed. See Chapter 1, Range Improvements, of the FES.

3. *Comment.* I don't really see much need to point out how detrimental these fences could be to wildlife and especially antelope should a severe winter storm occur with possibly an anticipated loss of fifty-three percent of the animals or 5,061 antelope as indicated on page 3-50, 3-53 and 3-54 and other pages in the (draft) statement. We do not know how many horses would be lost.

Commentator 37

Response. The text in the FES has been revised. See Chapter 3 Wild Horses, Range Improvements.

4. *Comment.* Due to the lack of information about wild horses and limits on what we can gather on our project, I suggest that the Bureau undertake limited wild horse research. Most important would be a project to determine areas of use and movements. I suggest that the Bureau equip four horses in each management unit with solar powered radio collars and then locate these horses once a month for two years. These known movements could be used to assess future management and to determine the effects of present management. Also I suggest that the water needs of wild horses be studied in the field.

Commentator 17

Response. Annual inventories presently provide information on horse populations and population characteristics such as sex ratio, foaling, age, size, and color. As the Bureau progresses with expanding and updating inventories, information and analysis on distribution, movement, and habitat will be strengthened in the land use plans and environmental assessments.

5. *Comment.* The wild horses should remain where they are now. However, their numbers should be reduced to 1200 head, 400 of that on the checkerboard land.

Commentator 38

Response. Alternative 7 of Chapter 8 of the FES proposes to maintain wild horses where they are now. The proposed action as well as the alternatives propose maintaining herd populations at 800 horses within the Sandy area. The checkerboard lands are outside (south) of the study area and therefore proposed population levels for that area are not analyzed in this ES.

6. *Comment.* The impacts wild horses have on the environment should be stated in the environmental statement. Wild horse herds will do as much damage to watering places, streams, and forage if not more than livestock grazing does. Wild horses do not benefit the environment. Wild horses are not a native to the area. If left to fend for themselves, cattle and sheep could become as the wild horse, only wild cows and wild sheep.

Commentator 31

Response. While the problems stated are recognized, the purpose of the FES is to analyze the impacts of domestic livestock grazing and other resources; therefore, specific impacts caused by wild horses and other uses of the area were not analyzed.

7. *Comment.* . . .the Draft Statement should be revised to include a proposal for management of the Sandy Area with a horse population of at least the current level.

Commentator 362

Response. Development of an alternative that would include management of wild horses at a level at least that of current populations is not considered a viable alternative for the following reasons:

(1) Population counts dating back to 1964-65 and substantiated by the 1972 count indicate that the historical wild horse populations in the Sandy area totaled about 800 horses.

(2) Population increases over the past eight years and observations by professional range scientists, within and outside the Bureau of the wild horse migration patterns and habitat conditions and trends indicate that the horses are creating a significant adverse impact on the vegetative resource at the present population increasing levels.

(3) The reduced wild horse populations as proposed would be sufficient in size to maintain a viable gene pool and yet assure that the populations would not increase beyond the capacity of the habitat.

(4) All other comments received at the public hearings and in letters on the DES indicate public desire and recognition of the need to reduce horse populations in the Sandy area to a manageable level.

Before any wild horses could be removed from the Sandy area, a horse removal plan would be developed using the most recent data available; the draft wild horse unit management plans would be revised; and an environmental assessment record on the action would be prepared.

Cultural Resources

1. *Comment.* Further, it appears that the Sandy area contains other historic and archeological sites whose significance has not been determined. Page 2-118 (of the DES) states that a 1976 field survey covered only 0.3 percent of the Sandy grazing area. We believe that more extensive knowledge about the area's cultural resources should be obtained and the impacts on those resources from the grazing plan analyzed in the final statement.

Commentator 23

Response. The text in the FES has been revised. See Chapter 2 Cultural Resources, History.

2. *Comment.* We recommend contact with the SHPO and/or the State Archeologist to obtain their opinions as to the adequacy of our present knowledge of cultural resources in the area, and their opinions on the type and level of cultural resource survey that may be needed in the project vicinity. These opinions should be included in the final statement.

Commentator 23

Response. A letter to the State Historic Preservation Officer (SHPO) dated October 26, 1976, requested his review of the Sandy ES. The text in the FES has been revised to reflect his subsequent comment. See Chapter 2 Cultural Resources, History.

3. *Comment.* If the SHPO/State Archeologist indicate that a survey is advisable, we recommend that such be undertaken by the responsible Federal agency prior to approval of the final statement, and that a full discussion of the findings of such a survey be included in the final statement.

Commentator 23

Response. The text in the FES has been revised. See Chapter 2 Cultural Resources, History.

4. *Comment.* The final statement should include a determination of the level of significance (local, state, or national) for all cultural resources now known to exist, or which may be discovered, in the study corridor. Such determinations should be undertaken in consultation with the SHPO and with appropriate local groups or individuals with historical expertise. If it is determined that any such resources meet or may meet the National Register Criteria, then the procedures of 36 CFR 800.4(a)(2) and 36 CFR 63 should be followed and reported in the final statement. If National Register quality sites will be impacted, then compliance with the requirements of 36 CFR 800 should be demonstrated in the final statement.

Commentator 23

Response. A summary of consultation with the State Historic Preservation Officer (SHPO) is provided in the history section of Chapter 2 Cultural Resources, FES, and a statement of significance for archeological sites is contained in the archeological resources of the same chapter. See also Mitigating Measures 8, 27, and 28 in the FES for measures provided to mitigate impacts to national register quality sites.

5. *Comment.* No mention is made of the Chicken Springs Stage Station. The "Mormon Mail Station"is also Burnt Ranch; South Pass Station for the first Overland Stage Route, the Pony Express and the first transcontinental telegraph, and the Last or 9th Crossing of the Sweetwater for the Oregon-Mormon-California Trails. It was also the site of a stage station for the Point of Rocks-South Pass Road.

Commentator 31

Response. The text in the FES has been revised. See TABLE 2-63.

6. *Comment.* No mention is made of trail condition for any trail but the Oregon. The ruts there are described in various stages of condition. Much of those ruts were a part of the original Lander-Rock Springs Road and received much wagon and automobile traffic between those two points. Many of the ruts were undoubtedly caused by Model T's and A's and similar vehicles. Probably the most pristine trail in the Sandy Grazing District is the Point of Rocks-South Pass Road which has visible original ruts for over 50 of its 70-mile length.

Commentator 31

Response. The BLM has completed intensive trail inventories only on the Oregon Trail; therefore this is the only trail where the condition could be shown (MAP 2-32 of the FES). The Point of Rocks-South Pass City Stage Road is scheduled to be inventoried in the summer of 1978.

Visual and Recreation Resources

1. *Comment.* Several sites in the Sandy grazing area have been highly recommended as potential National Natural Landmarks, including Killpecker Sand Dunes,

Leucite Hills-Boars Tusk, Steamboat Mountain, and Oregon Buttes-Continental Peak. Checkerboard boundary fencing, trampling, and vehicular traffic may all further compromise the natural qualities of these landmarks. Consideration should be given to modifying the grazing plan in order to help preserve their natural integrity, and the final statement should discuss what measures will be taken to mitigate any adverse impacts to these areas. Specifically, fencing the checkerboard boundary would damage these areas by visual impact and the impacts of construction and livestock and vehicular traffic paralleling these fences. The proposed boundary fence would cross the Killpecker Dunes twice and would go right across the top of Steamboat Mountain.

Commentators 23, 31

Response. The text in the FES has been revised. Chapter 2 Visual Resources, Natural Landmarks, identifies the potential landmarks. Chapter 3 Visual Resources, Natural Landmarks, indicates the impacts of the proposed action on those landmarks.

2. *Comment.* And in your study, and I think Mr. Ragsdale touched on it, in your study, you point out that on that particular allotment, and I have a written agreement that I allow hunting and picnicking and all, but no overnight camping. You point out that the overnight camping on that allotment will go up 35 percent. I can't interpret the figures, but it is up to 35 percent, and it goes to plan four, the one we submitted (Alternative 4), it goes down to 10 or 12 percent. Well, in this case, you completely ignore the private land and it has happened, Good Lord, on that Sandy up there when they went up to inspect that, there is only two and one-half miles of little Sandy from Sweetwater—from Parson (sic) to the Forest Service that isn't state or deeded.

Commentator 46

Response. Camping was reported along the Sweetwater River in this allotment and visitor use was extrapolated from these observations. Use is primarily in the eastern part of the allotment. People are likely to avoid areas with cows, therefore, enforcement of "no overnight camping"is not likely to reveal this activity. The method of gaining visitor use figures was imprecise, involving the proportioning of use relative to known values. Camping was considered as it related to other use in the area and upon observation by BLM staff, campers, or evidence of campers such as fire pits, litter, etc. The camping use in this allotment occurs mostly on private and state land.

Camping use is projected to increase under the proposed action by approximately 23% (TABLES 3-59 and 2-67 of the FES) and to remain the same as the existing situation under Alternative 4 (TABLE 8-66 of the FES). The difference is related to site conditions explained in Chapter 3 Recreation Resources, Assumptions, of the FES. No distinction was made in the ES between public and private recreation use because it cannot be practically differentiated.

3. *Comment.* If what we are reviewing is truly a Sandy Grazing Environmental Statement, then I think it should have completely dwelt (sic) with all grazing animals equally, including livestock, wild horses and wildlife. This statement should have also included recreation so that additional management plans would not have to be developed separately such as for the Green River, Boars Tusk and Red Desert areas as mentioned on page 1-39 (of the DES).

Commentator 37

Response. The purpose of an ES is to document the analysis of the environmental effects of a specific action; in this case, livestock grazing. The BLM planning system is used to generate the above mentioned recreation management plans.

4. *Comment.* It would be desirable to separate out the use of a Fontenelle Reservoir and Big Sandy Reservoir. It seems that much of the recreational use on these reservoirs can be carried out with minimum conflict with grazing by either livestock or wildlife. This point should be emphasized.

Commentator 9

Response. The use on Fontenelle Reservoir and Big Sandy Reservoir were separated on TABLE 2-68 of the FES and represent approximately 13% of the estimated use of the Sandy area. The analysis considered use on an activity-by-activity basis. Those activities affected by the action show change in use. Those activities that can be carried out with a minimum of conflict are minimally changed or remain unchanged.

5. *Comment.* The values per visitor day for various recreational activities are suspect. As is the use of the data and the interpretation. Was there any reference to Clynn Phillips work? (Phillips, Clynn and Sheryl E. Ferguson. 1977. "Hunting and Fishing Expenditure Values and Participation Preferences in Wyoming, 1975", Water Resources Research Institute, University of Wyoming).

How do values used for Wyoming compare with values used for other states? How do you justify or reconcile the differences?

Commentator 9

Response. Clynn Phillips work was not used in the visitor use study. The data in the referenced document is not comparable to the data derived for use in the Sandy ES. "Hunting and Fishing Expenditure Values and Participation Preferences in Wyoming"is general in scope, while the data in the ES is specific to the Sandy area. The data included in the Sandy ES is based on personal observation, interviews, and other available data. This data was then extrapolated to determine estimated use levels. There is, however, no apparent conflict between the methods used in the ES and the work by Phillips.

For additional information, see responses to Socioeconomic Conditions, Comments 2 and 12.

6. *Comment.* There is no analysis or consideration of what the environmental impacts of increased people use of the lands would be. Would there be increased degradation of water quality as a result? Would there be impacts on wildlife?

Commentator 1

Response. The text in the FES has been revised. See Chapter 3 Recreation Resources, Assumptions.

Livestock Grazing

1. *Comment.* . . .indicated cuts in livestock use varying from 18% as stated in Chapter 1 (of the DES) as against a 9% reduction as stated in Chapter 3. The writer of Chapter 3 (of the DES) obviously compared base property qualifications on Public Lands before the cut with public land use and private land use after the cut to arrive at the lesser percentage reduction. This is an obvious error.

Commentator 16

Response. Text in the FES has been changed so Chapter 3 corresponds with Chapter 1.

2. *Comment.* It is also recommended that another mitigating measure be applied to the proposed 18% cut in livestock use (in the DES) by making a lesser cut or no cut as previously mentioned.

Commentator 16

Response. The essence of the proposed action is to adjust grazing use to correspond with available forage. Grazing use could not be increased at the beginning of the program without further adjustments in season of use, grazing treatments, range developments, or reduced allowances for competitive wildlife and wild horse use.

3. *Comment.* . . .that current livestock use at private lands in the Sandy area would remain essentially the same after implementation of the proposed action.

Commentator 46

Response. Chapter 3, Assumptions and Analysis Guidelines, of the FES states that this is a general assumption. The reader is then referred to Chapter 2 Livestock Grazing of the FES for a description of the various types of livestock operations in the area and the use of private lands in conjunction with them. There is no evidence to indicate that this relationship would not continue. The market for livestock operations such as those in the Sandy area still appears to be good. The analysis in Chapter 3 Livestock Grazing, Impacts on Permittees, of the FES acknowledges certain potential negative impacts to specific kinds of private lands.

4. *Comment.* Most of the livestock operators whom I represent, and there might be an exception, are utterly convinced that they cannot survive on the public lands under present conditions under your plans as proposed. If that is the case, your assumption at (sic) current livestock use of private land in the Sandy Area would remain essentially the same after implementation of the proposed action, is a pretty wild assumption, because if they can't survive on the Sandy, your own figures and your own tables show that they are anywhere from 20 percent to 80 percent dependent on the Sandy for their existence, and if they can't be out there, they got to be somewhere.

Commentator 46

Response. The analysis does not presume the willingness, desire, nor ability of any individual or group to continue in their present operation as a result of the proposed action, only that the use of the affected areas would continue essentially the same—livestock operations. It has not been demonstrated that the proposed action would preclude profitability; rather, it was predicted in the analysis that it would influence the marketability of the existing ranching operations.

5. *Comment.* At that time, we specifically requested in writing that the Bureau focus and examine impact of its plans upon certain aspects of the livestock, and the livestock operations within the study area specifically the effect on lamb crops and effect on breeding periods, and effect on lamb practice and so forth, which is already required under the manual anyway, and weren't considered in the AUM's (sic) (AMPs) I read, and isn't considered in this ES. . . .I am by certain sheepmen in this sheep country that now we are going to have lambs a little late, and we are going to have forty percent reduction in lambs, because we are already, giving (sic) the kind of sheep we graze in the area, pushing right up to the end of the cycle when we breed now. Your proposal to bring it on May 18, although you have pointed out in mitigation, that you might be able to move that back to May 1st. You haven't told us about another thing, those people who lamb on the lands, generally also shear on the private lands, which are usually located right where they lamb, and even though you mitigate by removing your entry to May 1, there is no mitigation for restoration and if they happen to land in three different pastures in three different years, two of which were not near shearing pens.

Commentator 41

Response. The text in the FES has been revised. See Chapter 3 Livestock Grazing, Impacts on Permittees.

6. *Comment.* Herders are mentioned in the article throughout that some people will herd and some people won't. Our proposal mentioned herding, and nobody has analyzed, are herders going to be a viable alternative ten

years from now. No one went this far to ask the immigration people the question, are we going to have sheep herders ten years from now. Is there going to be a labor pool in Rock Springs or America to do this type of job. Is the pay going to be able to be sufficient? Are we going to be getting enough prices for our products ten years from now to pay the equivalent wages in order to employ Americans in this type of livlihood (sic)?

Commentator 51

Response. The text in the FES has been revised. See Chapter 3 Livestock Grazing, Impacts on Permittees.

7. *Comment.* I could not find in the ES either economic or factual field data that large scale rest rotation will stabilize the livestock industry in this area. There are some costs shown, but they seem low to me and increased supervision and management funding to carry out the details of the program are not a sure thing.

Commentator 54

Response. Chapter 3 Livestock Grazing, Impacts on Permittees and Projects and Use Supervision, of the FES addresses stabilizing the livestock industry. Many of the livestock operators have requested to convert their present qualification from sheep to cattle. Allowing these requested conversions as proposed in Chapter 1, Components of the Proposal, would achieve this objective.

8. *Comment.* Proper use factors used in determining carrying capacity are proper use factors for selective grazing. The intended plan is for a more intensive grazing management system and, therefore, proper use factors based on selective grazing no longer apply.

I recommend that the carrying capacity for the start of the proposed plan or any proposed plan in the Sandy area be the base property qualifications as they exist today for the reason the proposed allowable use is not supported by the method of determining carrying capacity, demands for wildlife population, current or desired, and the factors used in determining the proposed carrying capacity.

Commentator 16

Response. The base property qualifications were established several years ago and are not a proper indication of the present vegetation production in the Sandy area. Also, proper wildlife and wild horse use was not considered when the base property qualifications were established. The grazing regulations for the public lands require the District Manager to establish the grazing capacity for each area in the district, to reserve sufficient grazing capacity for wildlife and wild horses, and to not confer grazing privileges in excess of the grazing capacity of the Federal range to be used. The Bureau procedure for setting proper grazing capacities is discussed in APPENDIX 2I of the FES. It involves the use of proper use factors. These factors were established using plant growth requirements, animal grazing preference, and applicable research studies, and they are applied to vegetative growth data to establish proper grazing capacity.

9. *Comment.* If what we are reviewing is truly a Sandy Grazing Environmental Statement, then I think it should have completely dwelt with all grazing animals equally, including livestock, wild horses and wildlife. This statement should have also included recreation so that additional management plans would not have to be developed separately such as for the Green River, Boars Tusk and Red Desert areas as mentioned on page 1-39 (pf the DES).

Commentator 37

Response. The purpose of the ES is to focus on the impacts of implementing the proposed livestock grazing management; however, other resources such as wildlife, wild horses, and recreation are also addressed. For example, forage allocations for all major grazing animals (domestic livestock, wildlife, and wild horses) are presented in TABLE 1-4 of the FES. The interrelationships section in Chapter 1 of the FES further documents the coordination between the proposed livestock grazing management and the management for other resources. Specifically, the wild horse unit management plans and the wildlife habitat management plans were prepared concurrently with the allotment management plans to facilitate a fully coordinated management proposal for livestock grazing. Other resources such as recreation, soils, and water are treated in the analysis to the extent that they are impacted by the proposed livestock grazing management.

10. *Comment.* The statement does not evaluate how the proposal or alternatives would affect the total ecosystem, including nonfederal lands within the area. It should be understood recommendations on public land will affect adjoining private land.

Commentators 14, 40

Response. The text in the FES has been revised. See Chapter 3 Assumptions and Analysis Guidelines, Number 4.

11. *Comment.* You have not taken into affect what this will have on Cokeville. This big area you are studying is probably only three months use to the average operator. It has not had any identification of the environmental impact on the Rock Springs Grazing Association, which is winter on the Cumberland or on the Cokeville, or on the national forest resource, which are quite a few sheep go on for summer allotment.

Commentator 51

Response. The text in the FES has identified there would be impacts on areas outside the study area. See Chapter 3 Livestock Grazing, Impacts on Permittees. Chapter 1 Interrelationships, U.S. Forest Service, of the FES documents the interrelationships with management on the adjacent National Forests.

12. *Comment.* . . .the statement has not adequately assessed water developments as a management tool, whether for livestock management or wild animal management, neither has it adequately considered herding of livestock as a management tool. . . .

Commentator 14

Response. The FES considers herding and control of water as a management tool. See Chapter 1 Proposed Action, Grazing System Management. Those allotments where water control and herding are considered in rotation of livestock are the Red Desert, Bush Rim, Continental Peak Allotments and the Farson Use Area of the Little Colorado Allotment. Analysis of the impacts of herding and water control is assessed in Chapter 3 Wildlife, Wild Horses, and Livestock Grazing of the FES.

13. *Comment.* Concentrating cows into a relatively small area will not increase their probability of being bred unless they are in estrus. Again, research has indicated that high intensities of grazing can have detrimental effects on percent calf-crop.

The nutritional value of year-old dry grass of the types found in the Sandy area is probably very low. Even mixed with green grass the nutritional content of the ration is likely to be low. A combination of a lower nutritional value of the feed ingested, which is likely, with high intensities of grazing and perhaps limited feed availability could touch off a chain reaction of undesirable consequences. It could reduce the number of cows in estrus within 50, 70, or 90 days after calving, reduce the percentage calf-crop, lengthen the calving period for those cows which do calve, and in turn, reduce the average calf age at weaning time and the average calf weight.

Commentator 9

Response. The text in the FES has been revised. See Chapter 3 Livestock Grazing, Impacts on Livestock.

14. *Comment.* In reviewing this ES I am impressed that perhaps some past history of grazing in the area should have been provided. Also, perhaps some comparison of conditions at the time of original passage of the Taylor Grazing Act, at some intermediate points, and at present might have been desirable to show what has been done in the grazing use of this area.

Commentator 9

Response. Grazing history of the Sandy area is available for review in the Rock Springs District Office on an allotment-by-allotment basis (URA Step III-Jack Morrow Planning Unit). It was not included in the FES because of its volume. It was considered in the development of the proposed action. Some background on past adjudication was added to the background section of Chapter 1 in the FES.

15. *Comment.* I fear that if it is alternately grazed it will cause much more impact, especially in the areas where the cattle water. Fish Creek itself suffers from this problem now and, if used for an entire season, I think the damage would be far greater than it is presently.

It is my opinion that what is needed most is water development in the form of reservoirs and perhaps wells or spring development on the higher benches to relieve the concentrated grazing on the creek bottoms.

Commentator 28

Response. The proposed action calls for twenty new water developments in the alternately grazed pastures to obtain better livestock distribution and relieve the concentrated use on the creek bottoms. Monitoring studies described in Cahpter 4 of the FES are designed to monitor livestock utilization of important wildlife habitat and critical watershed area. These studies are provided to determine if, and when, additional water developments would be needed to meet the objectives of the allotment management plans. The adverse environmental impacts of the two-pasture alternately grazed system are also discussed in the aquatic wildlife section of Chapter 3 Wildlife. The problem of concentrated livestock use in the creek bottoms was recognized in the impact analysis Chapter 3 of the DES. Chapter 8, Alternative 6 was then developed to address this problem.

16. *Comment.* The existing draft does not address the potential environmental effects on non-public rangeland resource areas, should the Proposed Action or Alternatives be implimented (sic).

Commentator 29

Response. The text in the FES has been revised. See Chapter 3 Assumptions and Analysis Guideline, Number 4.

17. *Comment.* Alternative 3: *Allow conversions without* fences—This Alternative is not an appropriate Alternative to the Proposed Action because it does not address a change in grazing intensity.

Commentator 29

Response. The grazing intensity under this alternative is different than either the grazing intensity under the proposed action (TABLE 1-4 of the FES) or the existing situation (TABLE 2-24 of the FES). Grazing intensity is only one variable to consider when selecting alternatives for analysis and others require consideration. In the case of this alternative, the other principal variable was fencing.

18. *Comment.* The combinations of Treatments (A), (E), (B), and (C) into three pasture rest-rotation systems will not provide the *optimum* situation for the resource. In desert habitats, rest-rotation systems designed with 4-6 pastures, have a better *chance* for success than those with three pastures. It is questionable whether or nor rest-rotation is even *a proper* technical tool for use in management of dry desert rangelands.

Commentator 29

Response. The grazing systems included in the proposed action are not considered optimum but were designed to adequately accomplish the objectives and goals of the AMP with the minimum amount of fences. The monitoring studies identified in Chapter 4 of the FES are designed to evaluate whether the goals and objectives of the AMPs are being met. These studies will also be used as a basis for making adjustments in the grazing systems, seasons of use, use levels, etc. The three-pasture grazing systems were selected over systems with more pastures in order to keep fencing to a minimum to allow conversions and probably manage cattle use to meet the objectives and goals of the AMPs. As stated in Chapter 1 of the FES, Stoddard, Smith, and Box (1975) note that rest-rotation grazing has been widely accepted in temperate latitudes where seasonal grazing is occurring and cool season grasses exist. The Sandy area is in a temperate latitude and the key forage species shown on TABLE 1-10 are cool season grasses (Stoddard, Smith, and Box 1975).

19. *Comment.* Under *Livestock Grazing, Assumption* (page 3-114)—This rigid BLM policy of not allowing non-use except for the reason of conservation and protection of the resource will not be beneficial to the resource.

Commentator 29

Response. The assumption was made to provide for a complete analysis of livestock use at full grazing capacity.

20. *Comment.* Under *Grazing Treatments*, (page 3-114 of the DES) right column—Paragraph discussing Treatment A states that "holding livestock in one pasture *would* force them to spread out over the pasture, utilizing lightly grazed steeper slopes and less preferred forage". It is *hoped* this will happen, but Muegler's study, earlier sited (sic) by BLM, states that livestock will not necessarily move out over the rougher ground if confined in a single pasture, but rather will increase the *utilization* of forage plants in areas *of existing* concentrations. Forcing cattle to stay in one pasture is not *the answer* to better distribution. Management tools such as salting, water controls, and herding, are much more effective towards that goal.

Commentator 29

Response. The text in the FES has been revised. See Chapter 3 Livestock Grazing, Impacts of Livestock, Grazing Treatments.

21. *Comment.* Why has BLM assumed that the existing custodial pastures will *continue* to be managed under the present situation?

Commentator 29

Response. In most instances, the custodial pastures are small in size and are used in conjunction with the base operation. They generally involve only small parcels of NRL land. The operators have not indicated a desire to change management of these pastures.

22. *Comment.* Alternative 3 (of the DES), to "allow conversions without fences,"has already proved to be unworkable. Cowboys needed to move congregations of cattle off the wet-bottoms are noted mostly by their absence. Trespass cattle from as far away as Jeffery City are showing up in the Sandy area. Cattlemen have demonstrated an inability or unwillingness to control their livestock on public land. To allow further conversions to cattle would only compound an already serious problem.

Alternative 4 (of the DES), designed by livestock operators, is simply a turn-em loose and look for-em later, drift system. The allowable "10 to 15%"drift would make trespass laws next to impossible to enforce. It would allow 15% of the livestock (more if past history is any indicator) to overgraze forage that is vital to the survival of wintering herds of wildlife.

This alternative would impose severe management problems for BLM since sorting out trespass livestock from among 15% of the herds that legally could be anywhere on the allotments would be next to impossible.

Also, this alternative is not much different than season-long use. It would allow livestock to take off spring growth, come back in the fall and graze off any re-growth, and would not allow build-up of organic matter which is essential to the well being of any plant community.

Commentator 30

Response. The text in the FES has been revised. See Chapter 3 Vegetation, Impacts of Grazing Systems; Livestock Grazing, Impacts on Livestock and Project and Use Supervision; and Chapter 4 Mitigating Measure 6a, Analysis of Effectiveness Number 6a, and Monitoring Studies Number 1.

23. *Comment.* Carrying capacity, as determined in this EIS, makes no allowance for these forage losses.

Commentator 30

Response. The Sandy Grazing ES is an analysis of the impacts of livestock grazing on the other resources. The loss of forage from oil and gas activities, ORV use, etc., is not analyzed within the confines of carrying capacity. Allowance for loss of AUMs through these activities will be made as this information surfaces through other documents.

24. *Comment.* Nowhere in the statement is the interrelationship of privately owned and leased lands vis-a-vis the public lands considered. The Bureau blithely assumes that all uses on the privately owned and leased lands will continue the same, no matter what the result under the proposed action or any alternative.

Commentator 1

Response. The interrelationships of privately owned and leased lands is treated in the following sections of the FES: Chapter 1 Interrelationships, Private; Chapter 2 Livestock Grazing, Individual Pastures; Chapter 2 Farming; and Chapter 3 Livestock Grazing, Impacts on Permittees. In addition Chapter 8 alternatives impact analysis points out predicted differences in impacts of the alternatives on farming and livestock grazing. Chapter 3 Assumptions and Analysis Guidelines, Number 4, of the FES notes: "Current livestock use. . . . . .would remain essentially the same. . . "

25. *Comment.* Production is not an average, instead it varies with precipitation. Clipping studies would reveal a suitable regression to allow adjustment of the grazing systems. If the Bureau of Land Management insists upon using "average production"then the standard deviation and coefficient of variation should be part of the analysis. In very real terms, I doubt if forage production can be predicted within plus or minus 60% in this area unless current precipitation is used to adjust the estimate.

Commentator 31

Response. Any grazing system is subject to modification as described in Chapter 1 Proposed Action, Grazing System Management, of the FES. In the event of drought or any other natural cause of range depletion, licensed use would be reduced in accordance with regulation 43 CFR 4115.2-1(e)(5). Years with higher precipitation than normal resulting in increased production of forage would provide for improved watershed condition.

26. *Comment.* We feel the document should describe more fully the interagency coordination between BLM and FS in the matter of livestock use, and it should explain the current Forest Service-Bureau of Land Management coordination situation. For example, what are the cases where cattle are turned on to National Forest allotments from the BLM? What is the status of management on these Forest Service allotments, and are there any present coordination measures being taken or needed? Chapter 3 Environmental Impacts of the Proposed Action should address how the proposed action will affect coordination between our agencies in these adjacent allotment situations.

Commentator 36

Response. Coordination with the Forest Service is discussed in Chapter 1 Interrelationships, U.S. Forest Service, of the FES. Livestock turned onto Forest Service allotments from BLM allotments is discussed by allotment in Chapter 2 Livestock Grazing of the FES. Prior to final implementation of any action in the Sandy area continued contacts with individual Forest Districts would be made to ensure management coordination.

Socioeconomic Conditions

1. *Comment.* Appendix pages A-59 and A-63 (of the DES), heading A and B: The use of this type of ratio procedure for estimating the number of man-equivalents involved in running livestock on the BLM lands is fine for *descriptive* purposes but it is inappropriate for any type of impact predictions or projections. Studies have shown that relationship between labor requirements and public lands AUMs consumed in a livestock operation are not linear when the public lands resource is removed. This is because of the dependent nature of the relationship between the private and public lands mix in an "average"livestock operation. When the public lands cut back X number of AUMs the total ranch looses (sic) a disproportionally larger amount of AUs due to the necessity of reshuffling resources to account for the loss of (frequently) irreplacable (sic) summer range. So, whereas this ratio method probably is an adequate indication of the number of man-equivalents involved in a total operation needed to run the livestock on public lands, it is not an appropriate methodology for estimating the number of man-equivalents that would be lost if the public lands were removed.

Commentator 4

Response. As stated in Chapter 3 Socioeconomic Conditions, Employment, of the FES, the impacts to regional employment are considered insignificant and the discussion is only meant to be descriptive. Recent studies (Abt Associates 1978) for the Southwest Wyoming Coal Environmental Statement indicate that agricultural employment in Sweetwater County, for example, constitutes only 243 jobs out of a total estimated employment figure of 19,653. In this one county, the proposal would create approximately 5 ranching jobs out of a sector that constitutes approximately 1.2% of total employment.

2. *Comment.* Appendix page A-63 (of the DES), recreation income heading: The values per animal which are presented in this section are questionable. Why is there such large variation between the various dollar costs of hunting the different types of game? It would appear to me that the difference is due (at least in part) to the mix between local (in area) and out-of-area hunters. If this is the explanation, or part of it, then I feel it should be clearly delineated.

Commentator 4

Response. The animal values used in the statement are averages compiled from data from throughout the U.S. They are used in all statements to maintain consistency and standardization for all ESs. The values are averages of costs for both in-area and out-of-area hunters. The large variation between animal values is due to differences in difficulty, time, and expense to achieve a kill for a particular animal.

3. *Comment. Definition of the region for purposes of* estimating *regional economic impacts*: There are several cases

in the report where inconsistencies exist in the definition of the region used to assess regional impacts. Moreover, it is not clear why, at times, the region of economic influence was limited to the boundaries of the Sandy area. Practically all ranch business would have to be transacted outside the Sandy area. This definition of the region justifies the low multiplier (1.37) but it also eliminates major impacts that would stem from a change in the current use pattern of the area's resources. The businessman that serves the areas (sic) ranchers will be affected by a change in resource use just as the ranchers will be impacted.

Commentator 8

Response. The region as defined in Chapter 2 Socioeconomic Conditions, Population, of the FES is comprised of parts of four counties: Sweetwater, Lincoln, Uinta, and Sublette. As stated in Chapter 3 Socioeconomic Conditions, Introduction, of the FES, most of the impacts generated by the Sandy area are insignificant on a regional basis.

4. *Comment.* . . ., said statement does not adequately consider the economic impacts of the proposed action on the livestock operators, on the recreational industry of the State of Wyoming, or on other users or on the lands of either the federal government, state or private users. . . .

Commentator 14

Response. The FES has been revised to use an updated value per AUM and identify that portion of the recreation income that is generated from sources outside of the Sandy area. See socioeconomic conditions sections of Chapters 3 and 8.

5. *Comment.* There is no supporting information or data pertaining to the benefit-cost analysis, nor an indication how it was performed. There is no indication as to what was considered to be cost, or what was considered to be benefits. Have the cost of future maintenance and supervision been taken into consideration? There is no consideration of whether secondary or tertiary costs and benefits were considered.

Commentators 9, 15, 46

Response. The benefit-cost study itself is not included in the statement. It is omitted to avoid prejudicing the analysis in favor of the proposal or any alternative; however, as stated in Chapter 1, Implementation and Management Procedures, of the FES, it is available for review in the library of the Rock Springs BLM District Office. All costs associated with the proposal are shown in Chapter 1, Range Improvements, of the FES.

6. *Comment.* In more than one subsection of socioeconomic conditions and tax base, reference is made to assessed valuation of livestock. We think it should be noted that the 1977 Legislature repealed the ad valorem tax on livestock, which became effective in 1978. That information should be removed from the draft.

Commentator 44

Response. The reference to the tax base has been removed from the statement. See all socioeconomic conditions sections of the FES.

7. *Comment.* The use of erroneous percentage of agricultural income from grazing together with years when prices were relatively low results in a serious understatement of the economic contribution of grazing.

Commentator 9

Response. The text in the FES has been revised to show percentage of agricultural income from grazing as an average of 1969 and 1974. See Chapter 2 Socioeconomic Conditions, Income, Livestock.

8. *Comment.* On Chapter 2, page 144 (of the DES), there is a statement, "the percentage of total regional income derived from ranches using Sandy Area (sic) resources are estimated to be approximately 5.4 percent of 1972 regional agricultural income and less than one percent of total regional income. (These computations account only for rancher income, hired labor was not included in the calculations)". This strongly implies ranchers net income is the only item included. The contribution to regional income from ranchers expenditures for purchase of vehicles, machinery, repairs, fuel, supplies, in addition to hired labor and any other production expenses are also not included, or considered for their effort on total regional income derived from ranches.

Commentators 9, 39

Response. The text in the FES has been revised. See Chapter 2 Socioeconomic Conditions, Income, Livestock.

9. *Comment.* Table (sic) 2-71 on page 2-145 (of the DES) shows farm earnings in 1972 at $21.4 million for the region, or $16.4 million for the three county area, excluding Sublette. Further, on Chapter 2, page 144 (of the DES), there is an indication that total livestock earnings for these three counties in 1970 were about $5.4 million dollars. Calculations used and sources of data are not clear and perhaps not complete. Cattle prices increased about twenty-five percent and sheep, lambs, and wool prices increased less than ten percent between

1970 and 1972. Costs also increased. In conclusion, it is very difficult to reconcile the $16.4 million in Table (sic) 2-71 and the $5.4 million on page 2-144 (of the DES).

Commentators 9, 39

Response. The text in the FES has been revised. See Chapter 2 Socioeconomic Conditions, Income, Livestock.

10. *Comment.* Some further calculations are made on the approximately $5.4 million to arrive at $2.85 per/AUM, as an indication of the value of grazing. This is not a return to land, and should not be construed as indicating directly the ability to pay grazing fees.

Using the CAST Task Force approach and value of $10 to 12 dollars/AUM with a multiplier of 2.25 the value would be put at $22.50 to $27.00, compared with $3.95/AUM derived from the Sandy Grazing Environmental Statement. The difference is 500% to 600%. Hardly a minor discrepancy. The data presented in Table (sic) 2-71 on page 2-145 of the Sandy Grazing Environmental Statement will come much closer to supporting the estimate made by CAST than to supporting the estimate that is developed on page 2-144 of the Statement and used repeatedly at subsequent points through the balance of the Statement.

Commentators 9, 39

Response. The text in the FES has been revised to distinguish net and gross income, and the AUM value has been adjusted. See Chapter 2 Socioeconomic Conditions, Income.

11. *Comment.* The recreational value associated with public lands in the Sandy Area (sic) I believe have been over-estimated through the improper use of data and improper interpretation of results.

Commentator 39

Response. The text in the FES has been revised to include a revised methodology to determine recreation income. See Chapters 2 and 3 Socioeconomic Conditions, Income, Recreation.

12. *Comment.* Expenditures by area resident recreationists are consumption expenditures, not basic income like that produced by agriculture. I do not believe it is appropriate to take all of the value of these expenditures, process by use of a multiplier, and then describe the result as income to the area, or an increase in income. I would expect most of the recreation use in the Sandy Grazing Area is by residents of the four-county area.

Commentators 9,39

Response. The text in the FES has been revised. Recreation values have been adjusted to show only increased income in region from nonregional residents. See Chapters 2 and 3 Socioeconomic Conditions, Income, Recreation, and response to Comment 13, Socioeconomic Conditions.

13. *Comment.* It appears that no distinction was made between the recreation activity attributable to local residents of the Sandy area and that activity attributable to non-local recreationists and tourists. Only those recreation days attributable to non-local recreationists and tourists should be considered to generate regional income.

Commentators 8, 39

Response. The text in the FES has been revised to show a contribution of 20% for nonregion residents and recreation income has been reduced accordingly. See Chapter 3 Socioeconomic Conditions, Income, Recreation.

14. *Comment.* Again, net income instead of gross income is used along with an incorrect multiplier and the economic impact of the proposal on livestock grazing is understated.

Commentator 9

Response. The text in the FES has been revised to show gross income, and the multiplier has been adjusted. See Chapter 3 Socioeconomic Conditions, Income, Livestock.

15. *Comment.* . . .The socioeconomic analysis portion of this draft statement is glaringly insufficient. There is a lack of regard for the real potential socioeconomic effects of the proposed action and the alternatives on the local economy and livestock industry.

Commentators 25, 29

Response. The text in the FES has been revised to provide a more technically correct analysis. See all socioeconomic conditions, sections of the FES.

16. *Comment.* . . .there is the understatement of economic impact, due to the misuse of economic data.

Commentator 9

Response. The text in the FES has been revised. See Chapter 8 Alternative 1, Socioeconomic Conditions.

17. *Comment.* . . .there is the understatement of the impact in connection with livestock grazing. There is also mention of the "recreation income"which is said to increase. It is not income for the most part. It is merely a consumption expenditure. These types of errors are repeated through the following pages: Page 8-72, Column 2, Paragraphs 4 & 5 (of the DES).

Commentator 9

Response. The text in the FES has been revised. See Chapter 8 Alternatives 2-6, Socioeconomic Conditions.

18. *Comment.* Given active use of 125,000 to 150,000 AUM's then the grazing of livestock is capable of producing $1.5 million to $2 million to gross receipts annually at the present time and probably $3.5 to $4.5 million in total economic impact in the area. . . .That fact should be given greater recognition and weight than has been given.

Commentator 9

Response. The text in the FES has been revised using a more appropriate AUM value and multiplier. See

Chapter 2 Socioeconomic Conditions, Income, Livestock.

19. *Comment. Determination of the value of Sandy area* AUMs: Considering the relative importance of the livestock options expressed in the six alternatives, it is disconcerting to realize the degree of arbitrariness associated with the $2.85 figure that is supposed to represent the value of a Sandy area AUM. Although reference is made elsewhere in the report to a 1974 article that appears in the May 1974 *Journal* of *Range Management* entitled, "Livestock Grazing on Federal Lands in the 11 Western States,"there is no attempt to reconcile, dispute or reject the $7.00 to $10.00 values per AUM cited in this article. While the authors of the Jorunal article were limited to secondary data, as was the case for the Sandy report, their methodology displays a reasonsed (sic) and practical logic and is documented with numerous research reports.

Commentators 8

Response. The AUM value has been revised in the FES. See Chapter 2 Socioeconomic Conditions, Income, Livestock and Chapter 8 Alternatives 1-6 Socioeconomic Conditions.

20. *Comment.* The recreation values used in the Sandy EIS represent estimated willingness to pay. They do not represent (1) the expenditures made by recreationists in the area as suggested by the EIS writers; (2) the income attributable to recreation in the local economy; (3) the value per recreation day; or (4) the value of the animals involved.

Commentator 9

Response. The recreation values presented have been used in all Bureau Range ESs for standardization and consistency. The basic methodology in the ES has been revised to convert expenditures to income generated by nonregional visitors. See Chapter 2 Socioeconomic Conditions, Income, Recreation, of the FES.

21. *Comment.* The use of this measure of the value of recreation to determine the impact of public land use decisions where recreation is a competing use (with livestock grazing, for instance) is inappropriate and incorrect. There are two major problems with using this yardstick for recreation activity: (a) there is no separation of the portions of the dollars spent by the hunters which accrue in the local economy vs somewhere else. This is important because only dollars spent locally will impact the local economy, and (b) only dollars spent by out-of-area hunters effect economic growth of the area. These dollars which come from outside the local economy (in this case the local economy in the Sandy Area) (sic) are called "basic"dollars and are the cause of economic change. Dollars spent by local hunters are *not* basic and should not be included in the impact estimate. This is a critical point—if the dollars spent by local hunters have been included in the impact estimate then the recreation figure (on page 2-159) is incorrectly stated.

Commentator 4

Response. The text in the FES has been revised. See Chapter 2 Socioeconomic Conditions, Income, Recreation, for revised methodology.

22. *Comment.* The definition of agricultural income as "net ranch income"is illogical in view of the definitions of recreation income and construction income on page 2-159 (of the DES). Recreation income and construction income are both defined in terms of gross flows, thus any comparison between these and agriculture greatly understates the value of agriculture to the local economy. If the BLM wants to make comparisons for benefit/cost (sic) analysis, or whatever, then it would be wise to be logically consistent in measuring those things to be compared.

Commentator 4

Response. The text in the FES has been revised. See Chapter 2 Socioeconomic Conditions, Income.

23. *Comment.* The livestock grazers do not believe the proposed action will give them more flexibility, but just the opposite. The livestock grazers feel the proposed action will cause them considerable hardship in management of their operations.

Commentator 31

Response. The text in the FES has been revised. See Chapter 3 Socioeconomic Conditions, Attitudes and Expectations.

24. *Comment.* It is stated that a benefit-cost study was conducted on each AMP to determine whether it is an economically feasible plan. It is stated that results of the b/c (sic) analyses are shown in Table 1-7 (of the DES). Table 1-7 is barely understandable after a review of the glossary. However, nowhere does the Bureau explain what it perceives as a benefit-cost analysis. Nowhere does the Bureau indicate what factors it considers to be benefits. Nowhere does the Bureau indicate what it considers to be costs. Nowhere does it give any analysis at all concerning the benefit-cost analysis. There is simply the bare statement and a reference to studies in the Bureau office. The other economic sections are much the same, whether under the proposed action or under the alternatives. Conclusions are stated, with little or no indication of the analysis followed to reach the conclusions or what factors were used in the analysis which is not described.

Commentator 1

Response. See response to Comment 5, Socioeconomic Conditions for comments referring to benefit/cost analysis. Chapter 2, Chapter 3, and APPENDIX 3E (Socioeconomic Conditions) of the FES contain step by step description of the methods used to compute impacts, including values used and the calculations themselves.

25. *Comment.* What would be the environmental impacts of the economic choices available to the private land owner if he could not use the lands for grazing operation purposes? This question is nowhere considered, so far as the users can tell, anyplace in the statement.

Commentator 1

Response. The impacts on the livestock operators resulting from elimination of grazing on Federal lands are presented in the FES analysis of Alternative 2 Livestock Grazing, Farming, and Socioeconomic Conditions. However, the analysis does not address the impacts of the various economic choices because the range of choices is too variable and the analysis would be speculative.

Alternative 1

1. *Comment.* Alternative one, no action is contradictory (sic). Isn't the fencing of the checkerboard land boundary an action.

Commentator 55

Response. The text in the FES has been revised. See Chapter 8 Introduction and Alternative 1 Description.

2. *Comment.* The livestock stocking rates in Gold Creek, Steamboat Mountain, Little Colorado, Red Desert, Bush Rim, and Sands Allotments are not now considered *heavy.* The last sentence in this paragraph is incorrect to state that "Production will go down in these allotments because of continuous *heavy* grazing ..". This sentence misrepresents the existing situation.

Commentator 29

Response. The text in the FES has been revised. See Chapter 8 Analysis of Alternative 1 Impacts, Vegetation, Vegetation Types.

Alternative 2

1. *Comment.* This alternative is an exercise in *futility* because it is not an economically or technically feasible alternative for the Sandy Area. The draft narrative written for this alternative is full of incorrect and misleading statements on the "benefits" to the resource which will occur if all livestock grazing is removed. The draft ignores the potential and probable adverse effects of the *lack* of livestock grazing on forage plants. Rangelands have evolved under, and are maintained by, the effects of grazing by animals, especially large herbivores. Livestock grazing is a *legitimate* grazing use on rangelands, and any management alternative which ignores this fact is not a feasible alternative.

Commentator 29

Response. Alternative 2 only considers discontinuation of livestock grazing and not elimination of grazing by wild horses and wildlife. By the reference to "adverse effects of the *lack* of livestock grazing"we assume the commentator is referring to the stagnation that can occur to some plants when they are not grazed. Since wild horses and wildlife would continue to utilize the forage plants, it was assumed this use would simulate the past conditions referred to under which "rangelands have evolved". The analysis of the impacts has taken these factors into account. See Chapter 8 Analysis of Alternative 2 Impacts, Vegetation, of the FES.

2. *Comment.* Another consideration, private ownership. Assume your alternative to that, you throw them off. You got some interesting assumptions there. . . . .I think you got to make some assumptions and do some environmental analysis of what happens if they have to change their operations. . . .If they can't be used for the purposes that they are presently being used when they are in private ownership. I think you got to consider those environmental impacts, because I think they are there.

Commentator 46

Response. Negative impacts on operators are detailed in Chapter 8 Alternative 2, Livestock Grazing and Socioeconomic Conditions. The text in the FES has been revised to clarify the analytical approach and assumptions for Alternative 2. See Chapter 8 Alternative 2, Analysis of Impacts.

3. *Comment.* The Sandy E.S. does not consider the option of no grazing.

Commentator 20

Response. The no grazing alternative is considered in Chapter 8 Alternative 2 of the FES.

Alternative 4

1. *Comment.* We strongly advise that this alternative be rewritten to incorporate the Sandy users' suggested revisions.

Commentators 1, 16, 18, 25, 28, 29, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 53, 55

Response. The text in the FES has been revised to incorporate a more thorough and representative description of the operators' proposal (Alternative 4). Additional information was provided by the livestock users regarding locations and kinds of improvements, pasture locations, and proposed grazing systems. This additional data affected analysis of the alternative in some site specific cases. No significant changes occurred in the Sandy area when considered as a whole, but some changes in

analysis were noteworthy on an allotment by allotment basis. Some of these changes were:

1. Predicted forage production increased over the long term on one allotment.
2. Percent vegetal cover increased in two allotments.
3. Grazing intensity and related soil compaction decreased in three allotments.
4. Channel stability improved in one allotment.
5. Predicted runoff decreased in one allotment.
6. Predicted long-term sheet erosion decreased in one allotment.
7. Short- and long-term grazing intensities changed in four allotments.
8. Potential wildlife mortality from fencing on winter habitat was reduced in the Little Sandy, Little Colorado, and Steamboat Mountain Allotments.
9. Forage production improved on some wildlife winter habitat areas.

2. *Comment.* It is recommended that the Buckskin-Sandy Allotment be put into a two-pasture deferred rotation system for the use of Midland-Dunton Sheep Company. This will cause a continuation of the high degree of management that this area has had in the past and will also avoid the necessity of removal and reconstruction of fences as proposed in the proposed plan. . . .The Reservoir Allotment is an individual allotment of Midland-Dunton Sheep Company. The major portion of the use on the Reservoir Allotment is by sheep which are herded. It is a waste of time, effort, and funds to fence pastures for sheep that are herded. The small amount of cattle and horse use in the Reservoir Allotment can also be herded as needed in order to conform to the prescribed grazing treatments.

Commentator 16

Response. The text in the FES has been revised to more accurately reflect the operator's proposal. See Chapter 8 Alternative 4 Description.

3. *Comment.* The Gold Creek Allotment needs a grazing plan which takes into consideration the effects of the climate and other environmental impacts such as big game hunting.

The Sharps pasture starts growing first and is followed by the Gold and Mill pastures, in that order. It should be used *first* and *last*, using the Gold and Mill pastures in-between. With proper manipulation of the periods of grazing, they will be reseeded and establish vigorous growth. It is not necessary for every single plant to reseed to establish more than an adequate supply of new seedlings. A timetable could be set up according to the needs of each pasture. If one pasture needs less grazing, shorten the time the cattle would be there. This would be established annually by a cooperative effort between the B.L.M. and the operator.

With such a plan, the cattle would not bother the elk in the Spring nor would the hunters bother the cattle in the fall. The cattle would be available to wean the calves in the Fall and insure that they would all be found before winter storms make it impossible to locate them. The range would be reseeded and continuously improved.

A practical plan must be used so that the operator as well as this resource land, and the general public will benefit from it.

Commentator 18

Response. The text in the FES has been revised to more accurately reflect the operator's proposal. See Chapter 8 Alternative 4 Description.

4. *Comment.* . . .Table 8-49 (of the DES) would seem, in some instances, to be misleading in definitional classification. For example, the Little Sandy Allotment is described as a migratory five pasture. The users would submit that it is a combination of 2 two-pasture deferred systems, with a single pasture essentially used for trailing. For example, the Little Colorado Boundary allotment is described as season long. The users would submit that, in conjunction with Poston Allotment, it is in reality a three-pasture deferred system. For example, the Common Allotment in the Little Colorado is described as a season long. The users would submit that it is in reality a combination of two systems. One system is a deferred two-pasture system, the other is a deferred one-pasture system. For example, Red Desert is indicated as a season long. However, the users would submit that it is the most intensive management system of all, inasmuch as it is a system devised specifically for large, arid areas. The users' attorney likes to refer to it as the New Mexico chase system (see Stoddard, Smith and Box, Range Management (3rd ed.) at pages 294-5.) The same comments as made with respect to Red Desert can also be made with respect to Pacific Creek Allotment.

Commentator 1

Response. The text in the FES has been revised to more accurately reflect the operator's proposal. See Chapter 8 Alternative 4 Description.

5. *Comment.* The statement that the impacts portray *a worst* case situation if all potential adverse conditions occur is hardly a *realistic* situation to analyze.

Commentator 29

Response. The text in the FES has been revised. See Chapter 8 Alternative 4, Wildlife, Terrestrial.

6. *Comment.* It is doubtful that *all* of the types *or all* wildlife species will do the same thing on the Sandy area.

Commentator 29

Response. The text in the FES has been revised. See Chapter 8 Alternative 4, Vegetation Impact Analysis, Two and Four-Pasture Deferred Systems.

7. *Comment.* How can *ample* forage be available but *class* 1 *qualifications* still not be met?

Commentator 29

Response. The text in the FES has been revised. See Chapter 8 Alternative 4.

8. *Comment.* . . .under *Vegetation types*—Impacts *will not* "be basically the same for all vegetation types"

Commentator 29

Response. The analysis in the FES bears out the statement when considered in its entirety.

9. *Comment.* The (draft) Statement states that under the proposed action, there would be an approximate 5% loss of antelope. However, one is not told how one gets to this conclusion. Hard digging and review of the tables accompanying the text does not help.

Then, in the analysis of the same animal under Alternative 4, the reader is told that there will be loss of from 10% to 50% in the population. In that analysis, it is indicated that the impacts shown assume a worst case situation that would result if all adverse conditions were to occur simultaneously. The reader is not told what these factors are and the language (and so far as one can tell, the analysis) is not used under the proposed action analysis. So, the reader is left in a situation where a proposed action involving some 500 plus miles of fences (many covering antelope migratory areas and critical winter habitat) will have less adverse impact on the antelope than a proposal with only 300 plus miles of fencing and considerably fewer fences affecting migration and winter habitat.

Commentator 1

Response. The text in the FES has been revised. See Chapter 8 Description of Alternative 4.

Alternative 7

1. *Comment.* Several commentators expressed a need for an additional alternative which would be more responsive to the needs of wildlife and wild horses.

Commentators 31, 30, 26, 15, 37, 46, 55, 38

Response. The comments have been used to develop the management components of a new alternative which is described and analyzed in Chapter 8, Alternative 7.

2. *Comment.* The International Society for the Protection of Mustangs and Burros is proposing an additional alternative which we will call Alternative Number Seven. This alternative would not allow any additional fences to be built in the Sandy Grazing Unit except that we would favor the fencing of some Riparian areas. We would recommend that studies be made to determine if there are any existing fences that are detrimental to wild horses and or wildlife and if so, determine that they be removed immediately upon completion of said study.

All gates on existing highway fences would have to be modified so that the same material would be used in the gate as is used in the fence. Three strand or four strand wire could not be used in gates on a woven wire fence. . . .We favor herding by the operator to control livestock movement. Anyone in trespass should be severely dealt with and if this occurred more than twice, he should lose his grazing permit.

Reductions of grazing capacity should be made on allotments where excessive soil erosion and poor livestock range conditions exist. Any allotment that would have a decrease in the channel stability should immediately have a reduction in livestock grazing.

There should be no fence between the Sandy grazing unit and the checkerboard lands. . . .Water developments should accelerate in areas where more water would enhance grazing management except in critical winter habitat areas. Wild free roaming horses should be managed in accordance with the Wild and Free Roaming Horse and Burro Act. Numbers should be reduced to their 1971 population figures and managed in the areas where they were at that time.

We would recommend that no non-use be activated in any area until further studies are made.

Commentator 37

Response. All of the following significant elements of this proposal are addressed in Alternative 7 of the FES, except for items 3 and 5:

(1) Allow no additional fencing except for riparian areas-Alternative 7.

(2) Study existing fences to determine if modifications are needed-Alternative 7.

(3) Modify gates on existing highway fences-This problem, although the responsibility of the State Highway Department, was assessed, and it was determined that it did not have a significant enough impact to wild horses to include in the statement.

(4) Herd livestock to control their movements-Alternative 7.

(5) Reduce livestock grazing capacities on areas with poor range conditions-Alternative 5. No further analysis was made in Alternative 7 to avoid duplication.

(6) Do not fence between the checkerboard lands and the Sandy area-Alternative 7.

(7) Do not develop additional waters except in crucial winter habitat areas-Alternative 7.

(8) Manage wild horses in accordance to the Wild and Free-Roaming Horse and Burro Act and reduce their numbers to the 1971 levels-Alternative 7.

(9) Do not activate nonuse until further studies are completed-Alternative 7.

Alternatives-General

1. *Comment.* Mitigation has not been applied to these proposals (alternatives).

Commentator 54

Response. The Chapter 4 mitigation measures applied to the proposed action have been applied, where applicable, to each of the alternatives as identified in the Chapter 8 General Description of the FES. Mitigating measures applicable to each alternative have not been developed because of the additional volume of data that would be generated and because of procedural guidelines. If all or portions of an alternative(s) were adopted, appropriate mitigating measures would be developed before implementation.

2. *Comment.* We specifically requested on at least four different occasions, at the hearings in May of 1976, that the Bureau of Land Management consider in its environmental impact analysis, the recommendation at page 112 (of the DES) of the public land law review reports as an alternative to the proposed action. And that being specifically that the Bureau of Land Management discontinue its management system based on licensing amounts, class and title of use, and convert to a system individual allotment with specified maintenance of range condition proposed action in order to control use in those individual allotments.

Commentator 46

Response. This alternative is not considered to be a viable alternative because of the complexity of the area to be managed for the following reasons:

(1) It would require establishing individual allotments.

(2) It would require additional fences beyond the number of miles in the proposed action in order to control use in those individual allotments.

(3) It would increase the number of allotments from 16 to as many as 44, which would increase administrative responsibilities of the Bureau.

(4) It would decrease the Bureau's flexibility in the management and protection of wildlife and wild horse habitat, which is necessary in order to meet dynamic population and migration pattern changes.

APPENDIX 1A

PROPOSED ACREAGES, GRAZING SYSTEMS, AND GRAZING TREATMENTS FOR ALLOTMENTS BY PASTURE

Allotment / Pasture #	Acres	Grazing System	Treatment by Pasture by Year 1	2	3	4	5	6
1. Bar X								
1	2,124	Deferred 3-Pasture	E	E	B	B	D	D
2	2,543	Deferred 3-Pasture	B	B	D	D	E	E
3	2,228	Deferred 3-Pasture	D	D	E	E	B	B
Total Acres	6,895							
2. Fish Creek								
1	3,389	Alternately Grazed 2-Pasture	A	C	A	C	A	C
2	3,848	Alternately Grazed 2-Pasture	C	A	C	A	C	A
Total Acres	7,237							
3. Gold Creek								
1	4,662	Alternately Grazed 4-Pasture	E	C	E	C	E	C
2	10,591	Alternately Grazed 4-Pasture	B	C	B	C	B	C
3	9,327	Alternately Grazed 4-Pasture	C	E	C	E	C	E
4	5,905	Alternately Grazed 4-Pasture	C	B	C	B	C	B
Total Acres	30,325							
4. Little Sandy-Little Prospect								
1	41,759	Rest-Rotation 3-Pasture	A	B	C	A	B	C
2	57,303	Rest-Rotation 3-Pasture	B	C	A	B	C	A
3	56,968	Rest-Rotation 3-Pasture	C	A	B	C	A	B
4	16,086	Alternately Grazed 2-Pasture	A	C	A	C	A	C
5	13,342	Alternately Grazed 2-Pasture	C	A	C	A	C	A
Total Acres	185,680							
5. Steamboat Mountain								
1	23,497	Deferred 2-Pasture	E	B	L	B	E	B
2	17,040	Deferred 2-Pasture	B	E	B	E	B	E
Total Acres	40,537							
6. Little Colorado: Green River Use Area								
1	102,102	Rest-Rotation 3-Pasture	A	B	C	A	B	C
2	117,176	Rest-Rotation 3-Pasture	B	C	A	B	C	A
3	84,513	Rest-Rotation 3-Pasture	C	A	B	C	A	B
Subtotal Acres	303,791							
Parson Use Area								
1	58,422	Rest-Rotation 3-Pasture	A	B	C	A	B	C
2	63,106	Rest-Rotation 3-Pasture	B	C	A	B	C	A
3	83,595	Rest-Rotation 3-Pasture	C	A	B	C	A	B
Subtotal Acres	205,123							
Big Sandy Use Area								
1	68,199	Rest-Rotation 3-Pasture	A	B	C	A	B	C
2	77,789	Rest-Rotation 3-Pasture	B	C	A	B	C	A
3	72,054	Rest-Rotation 3-Pasture	C	A	B	C	A	B
Subtotal Acres	218,042							
Total Acres	726,956							
7. Red Desert								
1	83,671	Rest-Rotation 3-Pasture	E	B	C	E	B	C
2	78,987	Rest-Rotation 3-Pasture	B	C	E	B	C	E
3	80,717	Rest-Rotation 3-Pasture	C	E	B	C	E	B
Total Acres	243,375							
8. Bush Rim								
1	36,964	Rest-Rotation 3-Pasture	E	B	C	E	B	C
2	35,050	Rest-Rotation 3-Pasture	B	C	E	B	C	E
3	32,533	Rest-Rotation 3-Pasture	C	E	B	C	E	B
Total Acres	104,547							
9. Continental Peak								
1	30,882	Rest-Rotation 3-Pasture	E	B	C	E	B	C
2	28,208	Rest-Rotation 3-Pasture	B	C	E	B	C	E
3	29,388	Rest-Rotation 3-Pasture	C	E	B	C	E	B
Total Acres	88,478							
10. Pacific Creek								
1	71,747	Rest-Rotation 3-Pasture	E	B	C	E	B	C
2	62,652	Rest-Rotation 3-Pasture	B	C	E	B	C	E
3	68,457	Rest-Rotation 3-Pasture	C	E	B	C	E	B
Total Acres	202,856							

APPENDIX 1A (continued)

PROPOSED ACREAGES, GRAZING SYSTEMS, AND GRAZING TREATMENTS FOR ALLOTMENTS BY PASTURE

Allotment / Pasture #		Acres	Grazing System	Treatment by Pasture by Year 1	2	3	4	5	6
11. Sands									
	1	38,694	Rest-Rotation 3-Pasture	A	B	C	A	B	C
	2	37,986	Rest-Rotation 3-Pasture	B	C	A	B	C	A
	3	38,172	Rest-Rotation 3-Pasture	C	A	B	C	A	B
	Total Acres	114,852							
12. White Acorn									
	1	12,741	Rest-Rotation 3-Pasture	A	B	C	A	B	C
	2	8,048	Rest-Rotation 3-Pasture	B	C	A	B	C	A
	3	8,153	Rest-Rotation 3-Pasture	C	A	B	C	A	B
	4	7,622	Alternately Grazed 2-Pasture	A	C	A	C	A	C
	5	10,230	Alternately Grazed 2-Pasture	C	A	C	A	C	A
	Total Acres	46,794							
13. Prospect Mountain									
	1	10,128	Rest-Rotation 3-Pasture	A	B	C	A	B	C
	2	18,532	Rest-Rotation 3-Pasture	B	C	A	B	C	A
	3	14,730	Rest-Rotation 3-Pasture	C	A	B	C	A	B
	4	13,402	Alternately Grazed 2-Pasture	A	C	A	C	A	C
	5	9,959	Alternately Grazed 2-Pasture	C	A	C	A	C	A
	Total Acres	66,751							
14. Reservoir									
	1	10,932	Rest-Rotation 3-Pasture	A	B	C	A	B	C
	2	13,437	Rest-Rotation 3-Pasture	B	C	A	B	C	A
	3	11,176	Rest-Rotation 3-Pasture	C	A	B	C	A	B
	Total Acres	35,545							
15. Poston									
	1	16,857	Rest-Rotation 3-Pasture	A	B	C	A	B	C
	2	18,914	Rest-Rotation 3-Pasture	B	C	A	B	C	A
	3	14,864	Rest-Rotation 3-Pasture	C	A	B	C	A	B
	Total Acres	50,633							
16. Pine Creek									
	1	5,689	Rest-Rotation 3-Pasture	E	B	C	E	B	C
	2	4,588	Rest-Rotation 3-Pasture	B	C	E	B	C	E
	3	3,812	Rest-Rotation 3-Pasture	C	E	B	C	E	B
	Total Acres	14,089							

APPENDIX 1B

Forage Availability and Use By Pasture

The following tables were developed from information in the draft allotment management plans and vegetal production data for the Sandy area. This information is available for review in the Rock Springs District Office.

TABLE 1B-1 shows the forage that would be used by livestock and wildlife during the first six years following implementation of the proposed action. The proper use capacities in this table reflect present production. A breakdown by wildlife species by allotment is shown on TABLE 2-24.

TABLE 1B-2 shows proposed long-term livestock and wildlife use. Years vary by allotment because these are the long-term periods after implementation when the management objectives are expected to be met. A breakdown by wildlife species by allotment is shown on TABLE 3-15.

APPENDIX 2A

Soil Association Characteristics

The soil association descriptions in TABLE 2A-1 are intended for use with MAP 2-3 found in the pocket attached to the back cover of this statement. Additional information is listed in TABLE 2-2, and a detailed description of each soil association by mapping unit name and number is available upon request from the BLM Rock Springs District Office.

Detailed descriptions of the range sites shown in the last column of TABLE 2A-1 are available upon request from the Rock Springs District Office. Also available upon request are descriptions of the soil moisture and temperature regimes of the soil associations.

APPENDIX 2B

Use of the Musgrave Equation

Determining Erosion Rates

The sheet erosion rate for the Sandy area was determined by applying the Musgrave Equation to the soils of each mapping unit and obtaining a weighted average. Sheet erosion was then equated on the average slope of the mapping unit to determine the average sheet erosion.

The equation, derived from BLM Manual 7317.22A, is as follows:

$E = FR\,(S/10)^{1.35}\,(L/72.6)^{0.25}\,(P/1.375)^{1.75}$

Where: E = Sheet erosion rate in tons/acre/year.

R = Cover factor.

F = Basic erosion rate of bare soil in tons/year.

S = Average slope of contributing area in percent.

L = Length of longest contributing meander waterway in feet (field measurement).

P = Maximum 2-year frequency, 30-minute rain fall in inches.

The values for each of these factors by mapping unit are given in TABLE 2B-1. Specific considerations given for respective factors in the equation included:

F—The basic erosion rate was calculated for each mapping unit from TABLE 2B-2 (Illustration 5 of BLM Manual 7317.22A).

R—Using data from the Wyoming Integrated Study Procedure Survey (BLM Wyoming State Office Instruction Memo 75-31), the average ground cover for each mapping unit was calculated. TABLE 2B-3 lists the data and calculations. Data from TABLE 2B-4 was applied to a curve-fitting technique. The equation turned out to be a logarithmic curve of $R = -.5142 \times \text{Log (cover)} + 1.044$. The goodness of fit = $R^2 = .99$.

S—The average slope for each mapping unit was taken from the Sandy area soil association survey.

L—The average length of slope was determined for each mapping unit from the Sandy area soil association survey.

P—The maximum 2-year frequency, 30-minute rainfall was derived from Illustration 7 of BLM Manual 7317.22A.

The acreage of each mapping unit was determined within the boundaries of the proposed pastures and allotments. Then the total sheet erosion in tons per year was calculated for each use area by multiplying the number of acres by the sheet erosion rate.

Long-Term Calculations

The only factor that would change the sheet erosion rate for any given mapping unit in the long term would be vegetation. Soil mapping units were correlated with vegetation types using information in APPENDIX 2A. This correlation is shown in TABLE 2B-5.

The response of a vegetation type to a grazing system was not the same for each allotment, ranging from 0 to a 30% increase in ground cover in 5% increments. Therefore, the Musgrave Equation was used to recalculate sheet erosion rates for each mapping unit at increments of 5% ground cover increases up to 30% (TABLE 2B-6). These rates were then applied wherever the specified increases in cover were indicated. Decreased cover rates are listed on TABLE 2B-7.

Ground cover increases in the short term were predicted to be negligible or too small to measure; therefore, no short-term predictions have been made.

APPENDIX 2C

Soil and Wind Erodibility

Wind erodibility group (WEG) estimates should be based on dry soil aggregate sieving of the soil or of similar soil (TABLE 2C-1). If data are not available, estimates can be made using other properties as a guide.

Texture of the top inch of surface soil has the greatest single influence of soil erodibility and is used as a guide for estimating wind erodibility groups (TABLE 2C-2).

TABLE 18-1

FORAGE AVAILABILITY AND USE IN AUMS BY PASTURE
UNDER PRESENT PRODUCTION

Allotment / Pasture #	Proper Use Grazing Capacities [1]			Proposed Livestock Use by Year [2]						Actual Wildlife Use
	Cattle	Sheep	Wildlife	1	2	3	4	5	6	
1. Bar X										
1	248	292		360	360	346	346	173	173	
2	299	357		173	173	360	360	346	346	
3	272	320		346	346	173	173	360	360	
Total	819	969	1,965	879	879	879	879	879	879	148
2. Fish Creek										
1	393	426		888		888		888		
2	446	485			888		888		888	
Total	839	911	3,297	888	888	888	888	888	888	180
3. Gold Creek										
1	618	580		1,760		1,760		1,760		
2	1,461	1,345		1,761		1,761		1,761		
3	1,130	1,119			1,760		1,760		1,760	
4	733	711			1,761		1,761		1,761	
Total	3,942	3,755	13,685	3,521	3,521	3,521	3,521	3,521	3,521	1,463
4. Little Sandy-Little Prospect										
1	3,069	3,783		4,909	4,909		4,909	4,909		
2	4,261	5,190		4,909		4,909	4,909		4,909	
3	4,541	5,234			4,909	4,909		4,909	4,909	
4	1,472	1,707		2,794		2,794		2,794		
5	1,198	1,422			2,794		2,794		2,794	
Total	14,541	17,336	59,822	12,612	12,612	12,612	12,612	12,612	12,612	9,697
5. Steamboat Mountain										
1	1,187	1,292		855	855	855	855	855	855	
2	896	1,031		855	855	855	855	855	855	
Total	2,083	2,323	10,054	1,710	1,710	1,710	1,710	1,710	1,710	401
6. Little Colorado: Green River Use Area										
1	5,797	6,488		8,183	8,183		8,183	8,183		
2	6,297	7,196		8,183		8,183	8,183		8,183	
3	4,560	5,357			9,280	8,183		9,280	8,183	
Total	16,744	19,041	32,448	16,366	17,463	16,366	16,366	17,463	16,366	1,119
Farson Use Area										
1	3,906	3,874		6,819	6,820		6,819	6,820		
2	4,160	4,302		6,820		6,819	6,820		6,819	
3	4,936	5,177			6,819	6,820		6,819	6,820	
Total	13,002	13,353	15,958	13,639	13,639	13,639	13,639	13,639	13,639	805
Big Sandy Use Area										
1	3,115	3,534		6,146	6,147		6,146	6,147		
2	3,668	4,075		6,147		6,146	6,147		6,146	
3	3,719	3,936			7,243	6,147		7,243	6,147	
Total	10,502	11,545	25,122	12,293	13,390	12,293	12,293	13,390	12,293	1,224
7. Red Desert										
1	7,338	7,065		4,868	11,857		4,868	11,857		
2	5,762	6,313		11,857		4,868	11,857		4,868	
3	4,950	5,521			4,868	11,857		4,868	11,857	
Total	18,050	18,899	19,592	16,725	16,725	16,725	16,725	16,725	16,725	1,439
8. Bush Rim										
1	1,918	2,450		2,123	3,697		2,123	3,697		
2	2,459	2,923		3,697		2,123	3,697		2,123	
3	2,074	2,543			2,123	3,697		2,123	3,697	
Total	6,452	7,918	23,765	5,820	5,820	5,820	5,820	5,820	5,820	1,324

TABLE 18-1 (Continued)

FORAGE AVAILABILITY AND USE IN AUMS BY PASTURE
UNDER PRESENT PRODUCTION

Allotment / Pasture #	Proper Use Grazing Capacities 1/			Proposed Livestock Use by Year 2/						Actual Wildlife Use
	Cattle	Sheep	Wildlife	1	2	3	4	5	6	
9. Continental Peak										
1	2,419	3,029		2,990	3,563		2,990	3,563		
2	2,084	2,584		3,563		2,990	3,563		2,990	
3	1,749	1,892			2,990	3,563			3,563	
Total	6,252	7,486	16,830	6,553	6,553	6,553	6,553	6,553	6,553	1,324
10. Pacific Creek										
1	3,997	5,078		5,832	5,832		5,832	5,832		
2	5,354	6,338		5,832		5,832	5,832		5,832	
3	723	861			5,832	5,832		5,832	5,832	
Total	11,074	12,277	36,405	11,664	11,664	11,664	11,664	11,664	11,664	2,228
11. Sands										
1	1,638	2,166		2,025	2,025		2,025	2,025		
2	2,099	2,102		2,025		2,025	2,025		2,025	
3	1,738	2,153			2,025	2,025		2,025	2,025	
Total	5,475	6,421	11,857	4,050	4,050	4,050	4,050	4,050	4,050	1,077
12. White Acorn										
1	1,241	1,338		1,940	1,940		1,940	1,940		
2	960	914		1,940		1,940	1,940		1,940	
3	1,077	998			1,940	1,940		1,940	1,940	
4	899	918		1,504		1,504		1,504		
5	1,157	1,418			1,504		1,504		1,504	
Total	5,334	5,586	15,187	5,384	5,384	5,384	5,384	5,384	5,384	2,286
13. Prospect Mountain										
1	885	986		1,664	1,664		1,664	1,664		
2	1,232	1,379		1,664		1,664	1,664		1,664	
3	979	991			1,664	1,664		1,664	1,664	
4	930	920		1,356		1,356		1,356		
5	679	886			1,356		1,356		1,356	
Total	4,705	5,162	17,653	4,684	4,684	4,684	4,684	4,684	4,684	2,521
14. Reservoir										
1	681	689		1,179	1,179		1,179	1,179		
2	615	672		1,179		1,179	1,179		1,179	
3	348	446			1,179	1,179		1,179	1,179	
Total	1,644	1,807	6,150	2,358	2,358	2,358	2,358	2,358	2,358	730
15. Powson										
1	1,803	1,439		2,075	2,074		2,075	2,075		
2	1,168	1,727		2,074		2,075	2,074		2,075	
3	850	1,551			2,075	2,074		2,074	2,074	
Total	3,821	4,717	10,712	4,149	4,149	4,149	4,149	4,149	4,149	243
16. Pine Creek										
1	439	904		277	847		277	847		
2	421	527		847		277	847		277	
3	275	384			277	847		277	847	
Total	1,137	1,815	3,002	1,124	1,124	1,124	1,124	1,124	1,124	319

1/Information derived from vegetal production data which are available for review in the Rock Springs District Office.

2/The use shown in each of the six years is the combined use for sheep and cattle by allotment, and is based on information from the draft allotment management plans which are available for review in the Rock Springs Office.

TABLE 18-2

FORAGE AVAILABILITY AND USE IN AUMS BY PASTURE
UNDER LONG-TERM PRODUCTION

Allotment and Pasture #	Proper Use Grazing Capacities[1/]			Proposed Livestock Use by Year[2/]							Actual Wildlife Use
	Cattle	Sheep	Wildlife								
1. Bar X				Year	20	21	22	23	24	25	
1	320	375			392	392	375	375	189	189	
2	396	458			189	189	392	392	375	375	
3	370	412			375	375	189	189	392	392	
Total	1,086	1,245	2,224		956	956	956	956	956	956	200
2. Fish Creek				Year	18	19	20	21	22	23	
1	629	700			1,038		1,038		1,038		
2	673	670				1,038		1,038		1,038	
Total	1,302	1,370	3,891		1,038	1,038	1,038	1,038	1,038	1,038	215
3. Gold Creek				Year	22	23	24	25	26	27	
1	903	680				2,743		2,743		2,743	
2	1,751	1,418				2,743		2,743		2,743	
3	1,607	1,270			2,743		2,743		2,743		
4	928	786			2,743		2,743		2,743		
Total	5,189	4,154	27,347		5,486	5,486	5,486	5,486	5,486	5,486	1,794
4. Little Sandy-Little Prospect				Year	22	23	24	25	26	27	
1	3,734	4,317			6,495		6,495	6,495		6,495	
2	4,847	5,886			6,495	6,495		6,495	6,495		
3	3,106	3,798				6,495	6,495		6,495	6,495	
4	2,517	2,633			3,695		3,695		3,695		
5	2,041	2,037				3,695		3,695		3,695	
Total	16,245	20,671	83,665		16,685	16,685	16,685	16,685	16,685	16,685	12,067
5. Steamboat Mountain				Year	23	24	25	26	27	28	
1	1,426	1,817			1,142	1,142	1,142	1,142	1,142	1,142	
2	1,072	1,390			1,141	1,141	1,141	1,141	1,141	1,141	
Total	2,498	3,207	10,205		2,283	2,283	2,283	2,283	2,283	2,283	553
6. Little Colorado:											
Green River Use Area				Year	21	22	23	24	25	26	
1	8,970	9,875			12,489	12,489		12,489	12,489		
2	10,768	11,859			12,489		12,489	12,489		12,489	
3	7,155	7,967				14,164	12,489		14,164	12,489	
Total	26,893	29,701	35,058		24,978	26,653	24,978	24,978	26,653	24,978	1,157
Farson Use Area				Year	21	22	23	24	25	26	
1	5,649	6,217			9,800	9,801		9,800	9,801	9,800	
2	5,948	6,618			9,801		9,800	9,801		9,801	
3	6,891	7,807				9,800	9,801		9,800		
Total	18,488	20,642	23,527		19,601	19,601	19,601	19,601	19,601	19,601	832
Big Sandy Use Area				Year	21	22	23	24	25	26	
1	4,774	5,402			8,546	8,546		8,546	8,546		
2	5,846	6,841			8,546		8,546	8,546		8,546	
3	6,120	6,520				10,221	8,546		10,221	10,221	
Total	16,740	18,803	27,455		17,092	18,767	17,092	17,092	18,767	18,767	1,551
7. Red Desert				Year	17	18	19	20	21	22	
1	8,738	8,269			13,482		5,537	13,482		5,537	
2	6,759	7,808				5,537	13,482		5,537	13,482	
3	6,038	7,175			5,537	13,482		5,537	13,482		
Total	20,953	23,252	21,533		19,018	19,018	19,018	19,018	19,018	19,018	1,889

TABLE 18-2 (continued)

FORAGE AVAILABILITY AND USE IN AUMS BY PASTURE
UNDER LONG-TERM PRODUCTION

Allotment and Pasture #	Proper Use Grazing Capacities[1/]			Proposed Livestock Use by Year[2/]						Actual Wildlife Use
	Cattle	Sheep	Wildlife							
8. Bush Rim				Year	16	17	18	19	20	21	
1	2,431	3,294			4,676		2,686	4,676		2,686	
2	2,732	3,271				2,686	4,676		2,686	4,676	
3	2,353	1,810			2,686	4,676		2,686	4,676		
Total	7,516	8,375	27,265		7,362	7,362	7,362	7,362	7,362	7,362	1,580
9. Continental Peak				Year	16	17	18	19	20	21	
1	3,118	3,387			3,792		3,182	3,792		3,182	
2	2,527	2,940				3,182	3,792		3,182	3,792	
3	2,038	2,270			3,182	3,792		3,182	3,792		
Total	7,683	8,597	12,967		6,974	6,974	6,974	6,974	6,974	6,974	2,765
10. Pacific Creek				Year	16	17	18	19	20	21	
1	5,975	7,150			7,061	7,062		7,061	7,052		
2	5,942	6,526			7,062		7,061	7,062		7,061	
3	5,216	6,344				7,061	7,062		7,061	7,062	
Total	17,133	20,020	78,474		14,123	14,123	14,123	14,123	14,113	14,123	2,765
11. Sands				Year	22	23	24	25	26	27	
1	1,822	2,434			2,832	2,832		2,832	2,832		
2	2,370	2,400			2,832		2,832	2,832		2,832	
3	2,086	2,630				2,832	2,832		2,832	2,832	
Total	6,278	7,464	42,986		5,664	5,664	5,664	5,664	5,664	5,664	2,720
12. White Acorn				Year	18	19	20	21	22	23	
1	1,630	1,566				2,041	2,041		2,041	2,041	
2	1,129	1,047			2,041		2,041	2,041		2,041	
3	1,459	1,205			2,041	2,041		2,041	2,041		
4	1,233	1,184				1,582		1,582		1,582	
5	1,596	1,533			1,582		1,582		1,582		
Total	7,047	6,535	16,985		5,664	5,664	5,664	5,664	5,664	5,664	2,840
13. Prospect Mountain				Year	20	21	22	23	24	25	
1	1,115	1,122			1,986		1,986	1,986		1,986	
2	1,776	1,977			1,986	1,986		1,986	1,986		
3	1,314	1,329				1,986	1,986		1,986	1,986	
4	1,861	1,944			1,617		1,617		1,617		
5	1,487	1,614				1,617		1,617		1,617	
Total	7,551	8,186	34,086		5,589	5,589	5,589	5,589	5,589	5,589	2,779
14. Reservoir				Year	11	12	13	14	15	16	
1	921	946			1,251		1,251	1,251		1,251	
2	925	999				1,251	1,251		1,251	1,251	
3	867	905			1,251	1,251		1,251	1,251		
Total	2,713	2,850	13,425		2,502	2,502	2,502	2,502	2,502	2,502	991
15. Pearon				Year	17	18	19	20	21	22	
1	1,446	1,895			2,288		2,288	2,288		2,288	
2	1,602	2,120			2,289	2,289		2,289	2,289		
3	1,437	1,812				2,288	2,289		2,288	2,289	
Total	4,483	5,827	19,992		4,577	4,577	4,577	4,577	4,577	4,577	280
16. Pine Creek				Year	23	24	25	26	27	28	
1	661	1,027			1,107		362	1,107		362	
2	693	999				362	1,107		362	1,107	
3	563	831			362	1,107		362	1,107		
Total	1,917	2,857	4,545		1,469	1,469	1,469	1,469	1,469	1,469	371

1/ Information derived from vegetal production data which are available for review in the Rock Springs District Office.

2/ Based on the projected increase in proper grazing capacity from present to long-term production.

APPENDIX 1C

LAND STATUS BY CUSTODIAL PASTURE

Custodial Pasture	Acres of Land NRL	State	Private	Total Acres
C-1	170	29	62	261
C-2	77	0	27	104
C-3	144	0	72	216
C-4	54	0	37	91
C-5	297	50	131	478
C-6	503	0	213	716
C-7	265	0	306	571
C-8	13	0	395	408
C-9	96	0	577	673
C-10	71	22	640	733
C-11	178	53	685	916
C-12	66	0	123	189
C-13	13	82	4	99
C-14	16	8	0	24
C-15	2,209	120	437	2,766
C-16	96	45	93	234
C-17	197	41	307	545
C-18	120	5	134	259
C-19	191	0	203	394
C-20	3	8	43	54
C-21	1,094	192	691	1,977
C-22	19	0	235	254
C-23	92	0	260	352
C-24	1,197	88	957	2,242
C-25	2,153	200	855	3,208
C-26	1,677	0	952	2,629
C-27	98	565	545	1,208
C-28	80	0	800	880
C-29	13	554	195	762
C-30	1,083	1,152	2,127	4,362
C-31	537	0	1,148	1,685
C-32	85	0	135	220
C-33	8	0	80	88
TOTALS	12,915	3,214	13,469	29,598

TABLE 2A-1
SOIL ASSOCIATION CHARACTERISTICS

MAP 1/ UNIT NO	MAP UNIT NAME 2/	% OF MAP UNIT	SUBGROUP	FAMILY	OUTSTANDING CHARACTERISTICS 3/	ECOLOGICAL RANGE SITE 4/
110	Wet Alluvial Soils	10	Typic Fluvaquents	Coarse-loamy, mixed, calcareous, frigid	Deep, Wet	Sb
		20	Typic Halaquepts	Coarse-loamy, mixed, calcareous, frigid	Deep, Wet	SS
		20	Aquic Torriorthents	Coarse-loamy, mixed, calcareous, frigid	Deep, Wet	LL
		20	Typic Torrifluvents	Coarse-loamy, mixed, calcareous, frigid	Deep	Sy
		10	Typic Fluvaquents	Sandy, mixed, calcareous, frigid	Deep, Wet	Sb
111	Alkaline and Saline Soils Wet Alluvial Bottoms	10	Typic Halaquepts	Coarse-loamy, mixed, calcareous, frigid	Deep, Wet	SS
		10	Typic Halaquepts	Fine-loamy, mixed, calcareous, frigid	Deep, Wet	SS
		20	Typic Torriorthents	Coarse-loamy, mixed, calcareous, frigid	Deep	SL
		10	Typic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Deep	SL
		30	Typic Torrifluvents	Fine-loamy, mixed, calcareous, frigid	Deep	SL
		20	Typic Natrargids	Fine, montmorillonitic, frigid	Deep	SL
113	Playas, Vegetated	40	Vertic Torriorthents	Fine, montmorillonitic, calcareous, frigid	Deep	Cy
		40	Typic Torriorthents	Coarse-silty, mixed, calcareous, frigid	Deep	SU
		20	Typic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Deep	SU
114	Alluvial Fans, Sandy Soils	80	Typic Torriorthents	Coarse-loamy, mixed, calcareous, frigid	Deep	Sy
		20	Typic Torrifluvents	Coarse-loamy, mixed, calcareous, frigid	Deep	Sy
115	Alluvial Fans, Heavy Saline Soils	80	Typic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Deep	SU
		20	Typic Torrifluvents	Fine-loamy, mixed, calcareous, frigid	Deep over	SU
116	Gravelly Terrace Soils	60	Typic Calciorthids	Loamy-skeletal, mixed, frigid	Deep	Sy
		40	Typic Calciorthids	Coarse-loamy, mixed, frigid	Deep	Sy
117	Alluvial Fans, Sandy Saline Soils	100	Typic Torriorthents	Coarse-loamy, mixed, calcareous, frigid	Deep	SU
119	Playas, No Vegetation	100	Non-Soil Area (miscellaneous land type)		No Vegetation	
121	Canyons and Terrace Scarps	10	Rock Outcrop (No Vegetation)		Sandstone or Shale	
		30	Typic Torriorthents	Loamy, mixed, calcareous, frigid, shallow	Shallow	SwSy
		10	Typic Torriorthents	Loamy, mixed, calcareous, frigid, shallow	Shallow	SwLo
		20	Typic Torriorthents	Loamy, mixed, calcareous, frigid, shallow	Shallow	Sh
		20	Typic Torriorthents	Loamy, mixed, calcareous, frigid, shallow	Deep	Sy
		10	Lithic Torriorthents	Loamy, mixed, calcareous, frigid, shallow	Very Shallow	VS
123	Residual Uplands Moderately Deep Soils	20	Typic Calciorthids	Coarse-loamy, mixed, frigid	Moderately Deep	Sy
		20	Typic Calciorthids	Coarse-loamy, mixed, frigid	Deep	Sy
		20	Typic Torriorthents	Coarse-loamy, mixed, calcareous, frigid	Moderately Deep	Sy
		20	Typic Torriorthents	Loamy, mixed, calcareous, frigid, shallow	Shallow	SwSy
		10	Typic Torriorthents	Loamy, mixed, calcareous, frigid, shallow	Shallow	SwLo
		10	Typic Haplargids	Fine-loamy, mixed, frigid	Moderately Deep	Lo
124	Residual Uplands Shallow Soils	20	Typic Torriorthents	Loamy, mixed, calcareous, shallow, frigid	Shallow	SwSy
		10	Typic Torriorthents	Loamy, mixed, calcareous, shallow, frigid	Shallow	SwLo
		10	Typic Torriorthents	Loamy, mixed, calcareous, shallow, frigid	Very Shallow	Sh
		10	Lithic Torriorthents	Loamy, mixed, calcareous, shallow, frigid	Shallow	SwSy
		10	Lithic Torriorthents	Loamy, mixed, calcareous, frigid	Very Shallow	VS
		10	Lithic Haplargids	Loamy, mixed, frigid	Shallow	SwSy
		10	Lithic Calciorthids	Loamy, mixed, frigid	Shallow	SwSy
		15	Typic Calciorthids	Coarse-loamy, mixed, frigid	Moderately Deep	Sy
		5	Rock Outcrop			
126	Residual Upland Soils and Alkaline-Saline Soils	10	Typic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Deep Clay Loam	Lo
		10	Typic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Deep Clay Loam	SU
		10	Typic Torriorthents	Coarse-loamy, mixed, frigid	Dp Fine Sy Loam	Sy
		20	Typic Torriorthents	Coarse-loamy, mixed, frigid	Deep Sandy Loam	SU
		20	Typic Calciorthids	Coarse-loamy, mixed, frigid	Modrtly Dp Loam	Sy
		10	Typic Haplargids	Fine-loamy, mixed, frigid	Moderately Deep	Lo
		20	Typic Natrargids	Fine-loamy, mixed, frigid	Moderately Deep	SU
127	Playas and Sandy Soils	80	Playas (No Vegetation)			
		20	Typic Torripsamments	Mixed, frigid	Moderately Deep & Deep Sand	SU
132	Badlands	70	Rock Outcrop		Shale	
		30	Typic Torriorthents	Loamy, mixed, calcareous, frigid, shallow	Very Shallow	Sh
146	Dune Land	100	Sandy Dunes (No Vegetation)		Active, Shifting Dunes	

TABLE 2A-1 (continued)
SOIL ASSOCIATION CHARACTERISTICS

MAP UNIT NO.	MAP UNIT NAME 2/	% OF MAP UNIT	SUBGROUP	FAMILY	OUTSTANDING CHARACTERISTICS 3/	ECOLOGICAL RANGE SITE 4/
141	Stabilized Dunes	100	Typic Torripsamments	Mixed, frigid	Deep Sand	Sa
142	Dune Land and Stabilized Dunes	50	Sand Dunes (No Vegetation)		Dp Shftg Sand	
		50	Typic Torripsamments	Mixed, frigid	Deep Sand	Sa
143	Stabilized Dunes and Residual Upland Soils	30	Typic Torripsamments	Mixed, frigid	Deep Sand	Sa
		10	Typic Torripsamments	Mixed, calcareous, frigid	Dp Sa, Calcareous	Sa
		20	Typic Torriorthents	Coarse-loamy, mixed, calcareous, frigid	Deep	Sy
		10	Typic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Deep	SU
		10	Typic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwSy
		20	Typic Calciorthids	Coarse-loamy, mixed, frigid	Moderately Deep	Sy
210	Wet Alluvial Soils	20	Cumulic Haplaquolls	Fine-loamy, mixed, frigid	Deep, Wet	Sb
		20	Fluvaquentic Haploborolls	Coarse-loamy, mixed, frigid	Dp, Slightly Wet	LL
		20	Fluvaquentic Haploborolls	Fine-loamy, mixed, frigid	Dp, Slightly Wet	LL
		20	Aquic Haploborolls	Coarse-loamy, mixed, frigid	Dp, Slightly Wet	LL
		20	Typic Fluvaquents	Coarse-loamy, mixed, calcareous, frigid	Deep, Wet	Sb
211	Alkaline and Saline Soils	40	Typic Halaquepts	Coarse-loamy, mixed, calcareous, frigid	Deep, Wet	SS
		40	Typic Halaquepts	Fine-loamy, mixed, calcareous, frigid	Deep, Wet	SS
		20	Ustic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Deep	Lo
217	Alluvial Fans	70	Ustic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Deep	SU
		30	Aridic Haploborolls	Fine-loamy, mixed, frigid	Deep	Lo
220	Alluvial Mountain-Outwash Fans Noncalcareous Soils	20	Borollic Haplargids	Coarse-loamy, mixed, frigid	Deep	Sy
		40	Borollic Haplargids	Fine-loam over sandy or sandy-skeletal mixed, frigid	Deep	Lo
		40	Borollic Haplargids	Fine-loamy over sandy or sandy-skeletal mixed, frigid	Deep	Lo to Sy
221	Canyons, Ravines Steep Shallow Soils	10	Rock Outcrop (No Vegetation)		Sandstone and Shale	
		40	Ustic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwSy
		40	Ustic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwLo
		10	Ustic Torriorthents	Coarse-loamy, mixed, calcareous, frigid	Deep	Sy
222	Residual Uplands Shallow to Deep Soils	25	Ustic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwSy
		25	Ustic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwLo
		40	Ustic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Moderately Deep	Lo
		10	Borollic Haplargids	Coarse-loamy, mixed, frigid	Deep	Sy
223	Alluvial Fans and Upland Soils Shallow, Residual, Calcareous	40	Borollic Calciorthids	Coarse-loamy, mixed, frigid	Deep	Sy
		30	Borollic Haplargids	Coarse-loamy, mixed, frigid	Deep	Sy over Lo
		20	Ustic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwSy
		10	Ustic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwLo
224	Shallow Mountain Top Soils	50	Lithic Ustic Torriorthents	Loamy-skeletal, mixed, calcareous, frigid	Shallow	SwSy
		25	Ustic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwLo
		5	Ustic Torriorthents	Coarse-loamy, mixed, calcareous, frigid	Deep	Sy
		20	Lithic Haploborolls	Loamy, mixed, frigid	Shallow	SwLo
225	Mountain Outwash Soils Calcareous Material	85	Borollic Haplargids	Fine-loamy, mixed, frigid	Deep	Lo
		14	Lithic Ustic Torriorthents	Loamy, mixed, frigid	Shallow	SwSy
		1	Rock Outcrop (No Vegetation)		Granitic	
228	Stony, Glacial Till Soils	70	Aridic Argiborolls	Fine-loamy, mixed, frigid	Deep, Stony	Lo
		30	Pachic Haploborolls	Coarse-loamy, mixed, frigid	Deep	Lo
233	Soils on Steep Mountain Slopes and Ravines	20	Rock Outcrop (No Vegetation)		Sandstone or Shale	
		10	Ustic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwSy
		20	Ustic Torriorthents	Loamy, mixed, calcareous, frigid,shallow	Shallow	SwLo
		10	Ustic Torriorthents	Coarse-loamy, mixed, calcareous, frigid	Deep	Sy
		20	Ustic Torriorthents	Fine-loamy, mixed, calcareous, frigid	Deep	Lo
		20	Aridic Haploborolls	Fine-loamy, mixed, frigid	Deep	Lo

TABLE 2A-1 (continued)
SOIL ASSOCIATION CHARACTERISTICS

MAP UNIT NO. 1/	MAP UNIT NAME 2/	% OF MAP UNIT	SUNGROUP	FAMILY	OUTSTANDING CHARACTERISTICS 3/	ECOLOGICAL RANGE SITE 4/
310	Wet Alluvial Soils	25	Typic Cryaquolls	Coarse-loamy, mixed	Deep, Wet	WL
		25	Typic Cryaquepts	Coarse-loamy, mixed	Deep, Wet	WL
		25	Typic Cryoborolls	Coarse-loamy, mixed	Deep	LL
		25	Aquic Cryoborolls	Coarse-loamy, mixed	Dp, Slightly Wet	Sb
320	Mountain Outwash Soils		Argic Cryoborolls	Fine-loamy, mixed	Deep	Lo
			Typic Cryoborolls	Loamy, mixed, shallow	Shallow	SwLo
328	Stony, Glacial Till Soils	60	Argic Cryoborolls	Fine-loamy, mixed	Deep, Stony	Lo
		30	Pachic Cryoborolls	Coarse-loamy, mixed	Deep	Lo
		10	Typic Cryoborolls	Fine-loamy, mixed	Deep	Lo
333	Steep Mountain North and East Slopes	10	Rock Outcrop (No Vegetation)		Sandstone, Sh, Granite	
		60	Typic Cryorthents	Loamy, mixed, calcareous, shallow	Shallow	SwLo
		20	Pachic Cryoborolls	Coarse-loamy, mixed	Deep	Lo
		10	Argic Cryoborolls	Fine-loamy, mixed	Deep	Lo
350	Rocky, Mountain Soils	20	Rock Outcrop (No Vegetation)		Granitic	
		40	Lithic Cryoborolls	Loamy, mixed	Shallow	SwLo
		10	Argid Cryoborolls	Fine-loamy, mixed	Deep	Lo
		10	Borollic Haplurids	Fine-loamy, mixed, frigid	Deep	Lo
		20	Typic Cryoborolls	Fine-loamy, mixed	Deep	Lo

1/ Refer to soils map in packet on back cover of ES. A detailed description of soil moisture and temperature regimes is available upon request from the BLM Rock Springs District Office.
2/ Unit names were derived from geomorphologic setting of the soil.
3/ Refers to descriptive factor that would further classify the soil type.
4/ Refers to factors specifically limiting management for range land uses. Cy - clayey, WL - wet land; Sb - subirrigated; LL - lowland; SS - saline subirrigated; SL - saline lowland; Sa - sands; Sy - sandy; Ste - steep loamy, SwSy - shallow sandy; SwLo - shallow loamy, SU - saline upland, VS - very shallow, and Sh - shale. A detailed description of range sites is available upon request from the BLM Rock Springs District Office.

TABLE 2B-1

EXISTING SHEET EROSION AND FACTORS USED TO DETERMINE RATES BY MAPPING UNIT

Mapping Unit	F: Erosion Rate[1]	R: Percent Cover[2]	S: Average Slope[3] (Percent)	L: Length of Waterway (Feet)[3]	P: Rainfall (2 yrs-30min)[4]	E: Sheet Erosion Rate Tons/Acre/Year
110	28	75	2	502	.4	0.06
111	64	38	2	603	.4	0.41
113	82	27	1	3620	.4	0.51
114	21	64	5	1005	.4	0.27
115	97	49	4	2708	.4	2.01
116	40	56	2	2083	.4	0.25
117	52	29	4	625	.4	1.08
119	0	56	0	0	.4	0
121	14	68	22	833	.4	1.12
123	50	40	3	4167	.4	1.03
124	65	44	8	5280	.4	4.94
126	79	26	3	4167	.4	2.34
127	52	37	1	5280	.4	0.29
132	14	14	50	1250	.4	17.44
140	21	14	33	200	.4	7.86
141	21	13	17	200	.4	3.33
142	21	19	32	200	.4	6.41
143	52	26	3	1667	.4	1.12
210	88	90	2	1250	.5	0.18
211	79	44	2	625	.5	0.65
217	55	69	5	625	.5	0.77
220	55	38	3	1042	.5	1.09
221	65	71	22	1250	.5	8.00
222	79	26	7	1458	.5	7.52
223	61	56	5	2083	.5	1.91
224	12	45	17	2500	.5	2.80
225	63	63	7	1667	.5	2.36
228	50	84	18	833	.5	2.41
233	65	50	35	1042	.5	26.00
310	21	90	2	417	.6	0.04
320	64	63	7	1042	.6	2.80
328	44	81	18	833	.6	3.35
333	52	55	45	1042	.6	35.16
350	12	71	20	1250	.6	1.79

1/ Calculated from Musgrave Equation (BLM Manual 7317.22A).
2/ BLM Wyoming Integrated Study Procedure, Instruction Memo WSO 75-31.
3/ Data from soil survey.
4/ Value from TABLE 2-2 as correlated with BLM Manual 7317.22A, Illustration 7.

TABLE 2B-2

BASIC EROSION RATES BY SOIL UNIT*

Description of Soil Unit	Basic Erosion Rate, F Tons/acre/year Topsoil	Subsoil
Deep, fine-textured, very slowly permeable soils	97	105
Deep, fine-textured, slowly permeable soils	79	85
Deep, fine-textured, moderately permeable soils	63	65
Deep, fine-textured, very slowly permeable bottomland soils	97	105
Deep, fine-textured, slowly permeable bottomland soils	79	85
Deep, fine-textured, moderately permeable bottomland soils	63	65
Deep, medium-textured, very slowly permeable soils	116	110
Deep, medium-textured, slowly permeable soils	85	71
Deep, medium-textured, moderately permeable soils	50	53
Deep, medium-textured, rapidly permeable soils	44	26
Deep, medium-textured, slowly permeable bottomland soils	68	68
Deep, medium-textured, moderately permeable bottomland soils	51	51
Deep, coarse-textured, very slowly permeable soils	32	49
Deep, coarse-textured, slowly permeable soils	32	32
Deep, coarse-textured, moderately permeable soils	27	26
Deep, coarse-textured, moderately rapidly permeable soils	25	25
Deep, coarse-textured, rapidly permeable soils	24	21
Deep, coarse-textured, slowly permeable bottomland soils	32	32
Deep, coarse-textured, moderately permeable bottomland soils	21	21
Deep, coarse-textured, rapidly permeable bottomland soils	21	-
Shallow, fine-textured, very slowly permeable soils	97	105
Shallow, fine-textured, slowly permeable soils	79	85
Shallow, fine-textured, moderately permeable soils	63	65
Shallow, medium-textured, very slowly or slowly permeable soils	99	109
Shallow, medium-textured, moderately permeable or rapidly permeable soils	65	65
Shallow, coarse-textured, rapidly permeable soils	67	70
Very shallow, fine-textured soils	79	-
Very shallow, medium-textured soils	60	-
Very shallow, coarse-textured soils	12	-
Rough broken or rough stony land, noncalcareous materials	16	-
Rough broken or rough stony land, calcareous materials	14	-

* Developed by the Soil Conservation Service for use with Musgrave Equation.

TABLE 2B-3

AVERAGE GROUND COVER BY MAPPING UNIT

Mapping Unit	% Ground Cover from Transects Within Mapping Unit*	Average Ground Cover Within Mapping Unit
110	67, 84, 99, 49	(75)
111	63, 12	(38)
113	20, 32, 30	(27)
114	64	(64)
115	37, 62	(49)
116	56	(56)
117	22, 25, 48, 15, 36	(29)
119	25, 87	(56)
121	68	(68)
123	59, 31, 46, 44, 66, 16, 16, 38, 58, 25	(40)
124	41, 54, 2, 41, 45, 34, 50, 56, 60, 52	(44)
126	37, 16	(26)
127	37	(37)
132	14	(14)
140	24, 4	(14)
141	13	(13)
142	14, 24, 18	(19)
143	27, 46, 7, 24	(26)
210	92, 88	(90)
211	46, 41	(44)
217	68, 70	(69)
220	20, 26, 50, 28, 37, 72, 36	(38)
221	69, 70, 71, 71, 72	(71)
222	18, 33	(26)
223	42, 61, 68, 52	(56)
224	33, 56	(45)
225	50, 41, 32, 55, 75	(63)
228	84, 80, 88	(84)
233	58, 75, 34, 25, 52, 56	(50)
310	88, 90, 92	(90)
320	42, 40, 44, 97, 54, 64, 99	(63)
328	97, 64	(81)
333	55	(55)
350	48, 97, 99, 48, 98, 38, 62, 81	(71)

* From Wyoming Integrated Study Procedure Survey.

TABLE 2B-4

GROUND COVER (%) VS. MUSGRAVE COVER FACTOR
(RANGE AREA COVER CLASSES*)

Ground Cover Percentage	Musgrave Cover Factor (R)
5	0.60 - 0.70
10	0.50 - 0.60
15	0.40 - 0.50
20	0.35 - 0.45
25	0.30 - 0.40
30	0.25 - 0.35
35	0.20 - 0.30
40	0.15 - 0.25
45	0.13 - 0.23
50	0.10 - 0.20
55	0.09 - 0.18
60	0.08 - 0.17
65	0.07 - 0.15
70	0.05 - 0.13
75	0.04 - 0.10
80	0.04 - 0.09
85	0.03 - 0.08
90	0.02 - 0.07
95	0.01 - 0.06
100	0.00 - 0.05

* Range cover types and ground cover percentage as defined in BLM Manual 7313.22 and 7313.32A.

TABLE 2B-5

SOIL-VEGETATION TYPE CORRELATION

Soil Mapping Unit	Primary Vegetation Type
110	Greasewood
111	Saltbush-Winterfat
113	Greasewood
114	Sagebrush-Grass
115	Greasewood
116	Sagebrush-Grass
117	Saltbush-Winterfat
119	-No Vegetation-
121	Sagebrush-Grass
123	Sagebrush-Grass
124	Sagebrush-Grass
126	Saltbush-Winterfat
127	Sagebrush-Grass
132	-No Vegetation-
140	-No Vegetation-
141	Perennial Forb
142	Perennial Forb (1/3 of Perennial Forb Ground Cover Value)
143	Perennial Forb
210	Meadow
211	Grass
217	Sagebrush-Grass
220	Sagebrush-Grass
221	Sagebrush-Grass
222	Sagebrush-Grass
223	Sagebrush-Grass
224	Sagebrush-Grass
225	Sagebrush-Grass
228	Sagebrush-Grass
233	Mountain Shrub
310	Meadow
320	Sagebrush-Grass
328	Sagebrush-Grass
333	Mountain Shrub
350	Conifer

TABLE 2B-6

SHEET EROSION RATES WITH INCREASED COVER BY MAPPING UNIT

Soil	Present Rate	Rates With Increased Cover 5% Cover	10% Cover	15% Cover	20% Cover	25% Cover	30% Cover
110	0.06	0.05	0.04	0.03	0.03	0.02	0.01
111	0.41	0.39	0.37	0.35	0.33	0.31	0.29
113	0.51	0.49	0.47	0.46	0.44	0.42	0.40
114	0.27	0.25	0.22	0.20	0.17	0.14	0.12
115	2.01	1.89	1.76	1.64	1.51	1.39	1.26
116	0.25	0.23	0.21	0.19	0.17	0.15	0.14
117	1.08	1.04	1.00	0.96	0.92	0.88	0.84
119	0	0	0	0	0	0	0
121	1.12	1.00	0.88	0.76	0.64	0.52	0.40
123	1.03	0.98	0.93	0.88	0.83	0.78	0.72
124	4.94	4.67	4.40	4.13	3.86	3.59	3.32
126	2.34	2.26	2.18	2.10	2.02	1.94	1.86
127	0.29	0.27	0.26	0.25	0.23	0.22	0.21
132	17.44	17.02	16.61	16.19	15.77	15.35	14.93
140	7.86	7.67	7.48	7.30	7.11	6.92	6.73
141	3.33	3.25	3.17	3.10	3.02	2.94	2.87
142	6.41	6.23	6.05	5.87	5.69	5.51	5.33
143	1.12	1.08	1.04	1.00	0.96	0.93	0.89
210	0.18	0.13	0.08	0.03	0.03	0.03	0.03
211	0.65	0.61	0.58	0.54	0.51	0.47	0.43
217	0.77	0.68	0.60	0.51	0.43	0.34	0.26
220	1.09	1.03	0.98	0.93	0.88	0.83	0.78
221	8.00	7.05	6.11	5.16	4.21	3.27	2.32
222	7.52	7.26	7.00	6.74	6.48	6.22	5.96
223	1.91	1.77	1.63	1.48	1.34	1.20	1.05
224	2.80	2.64	2.48	2.33	2.17	2.01	1.86
225	2.36	2.14	1.93	1.71	1.49	1.28	1.06
228	2.41	1.93	1.45	0.97	0.48	0.48	0.48
233	26.00	24.34	22.67	21.01	19.35	17.69	16.02
310	0.04	0.03	0.02	0.02	0.02	0.02	0.02
320	2.80	2.54	2.28	2.03	1.77	1.51	1.26
328	3.35	2.77	2.19	1.60	1.02	0.44	0.44
333	35.16	32.59	30.02	27.45	24.88	22.31	19.74
350	1.79	1.58	1.36	1.15	0.94	0.73	0.52

TABLE 2B-7

SHEET EROSION RATES WITH DECREASED COVER BY MAPPING UNIT

Soil	Present Rate	Rates With Decreased Cover					
		5% Cover	10% Cover	15% Cover	20% Cover	25% Cover	30% Cover
110	0.06	0.07	0.07	0.08	0.09	0.10	0.11
111	0.41	0.43	0.45	0.47	0.49	0.51	0.53
113	0.51	0.53	0.55	0.57	0.59	0.61	0.62
114	0.27	0.30	0.33	0.36	0.38	0.41	0.44
115	2.01	2.15	2.28	2.41	2.54	2.67	2.81
116	0.25	0.27	0.29	0.30	0.32	0.34	0.36
117	1.08	1.12	1.16	1.21	1.25	1.29	1.33
119	0	0	0	0	0	0	0
121	1.12	1.24	1.37	1.50	1.62	1.75	1.87
123	1.03	1.08	1.14	1.19	1.25	1.30	1.35
124	4.94	5.23	5.51	5.80	6.08	6.37	6.65
126	2.34	2.42	2.51	2.59	2.68	2.76	2.85
127	0.29	0.30	0.31	0.33	0.34	0.35	0.37
132	17.44	17.88	18.32	18.76	19.20	19.64	20.08
140	7.86	(No cover on this mapping unit.)					
141	3.33	3.41	3.49	3.57	3.65	3.73	3.81
142	6.41	6.60	6.79	6.98	7.17	7.36	7.55
143	1.12	1.16	1.20	1.24	1.28	1.32	1.36
210	0.18	0.23	0.29	0.34	0.39	0.45	0.50
211	0.65	0.68	0.72	0.76	0.80	0.83	0.87
217	0.77	0.86	0.95	1.04	1.13	1.22	1.30
220	1.09	1.14	1.19	1.25	1.30	1.35	1.41
221	8.00	9.00	9.99	10.99	11.98	12.98	13.97
222	7.52	7.79	8.06	8.33	8.60	8.88	9.15
223	1.91	2.07	2.22	2.37	2.52	2.67	2.82
224	2.80	2.96	3.13	3.30	3.46	3.63	3.79
225	2.36	2.59	2.81	3.04	3.27	3.49	3.72
228	2.41	2.92	3.42	3.93	4.44	4.94	5.45
233	26.00	27.75	29.49	31.24	32.99	34.74	36.48
310	0.04	0.05	0.06	0.08	0.09	0.10	0.11
320	2.80	3.07	3.33	3.60	3.87	4.14	4.41
328	3.35	3.97	4.58	5.19	5.81	6.42	7.03
333	35.16	37.86	40.56	43.26	45.96	48.66	51.36
350	1.79	2.01	2.23	2.45	2.68	2.90	3.12

TABLE 2C-1

RELATIONSHIP OF DRY SOIL AGGREGATES
TO SOIL ERODIBILITY INDEX AND WIND ERODIBILITY GROUP

Wind Erodibility Group (WEG)	Dry Soil Aggregates 0.84 mm (percent)	Soil Erodibility Index (I) (tons/acre/year)
1	0.5-1.5	340-280
2	5.0-15.0	180-117
3	16.0-34.0	113-67
4	15.0-35.0	117-65
4L	15.0-35.0	117-65
5	28.0-52.0	79-33
6	36.0-54.0	63-29
7	36.0-64.0	63-17
8	--	--

TABLE 2C-2

GUIDE FOR ESTIMATING
WIND ERODIBILITY GROUP (WEG) FROM SOIL TEXTURES

TEXTURE OF SURFACE INCH*	WEG
Very fine sand, fine sand, and medium sand.	1
Loamy sand and loamy fine sand.	2
Very fine sandy loam, fine sandy loam, and sandy loam.	3
Clay, silty clay, noncalcareous clay loam, and silty clay loam with more than 35% clay content.	4
Calcareous loam and silt loam; calcareous clay loam and silty clay loam with less than 35% clay content.	4L
Noncalcareous loam and silt loam with less than 20% clay content; sandy clay loam; and sandy clay.	5
Noncalcareous loam and silt loam with more than 20% clay content; noncalcareous clay loam with less than 35% clay content.	6
Silt; noncalcareous silty clay loam with less than 35% clay content.	7
Very wet or stony; not subject to wind erosion.	8

*Samples were taken of the surface horizon, and it is assumed that the top inch of surface soil is the same texture.

Source: Soil Conservation Service, Handbook for Interpretations, Draft Key, February 11, 1972.

APPENDIX 2D

Methods Used to Determine Livestock Grazing Intensity

Slope, terrain, distance to water, and vegetation type are among the factors that influence the distribution of livestock on the range (Mueggler 1965). W. F. Mueggler used multiple regression analysis to develop an equation for predicting relative grazing use (intensity) from the percent of slope and the distance in yards that livestock would move upslope during grazing (Mueggler 1965).

The Mueggler Equation was used in predicting relative grazing use in the Sandy area. The equation is:

$\hat{Y} = 107.06 + 1.00\,X_1 - 95.37e^{-.0015X_2}$

Where $\hat{Y}$ = Predicted accumulated relative use to the specified upslope distance. Total use on the area was considered to be 100%.

X_1 = Slope steepness in percent.

X_2 = Distance upslope in yards.

e = Exponential function.

Estimates of grazing intensity pressure in acres per AUM were based on the assumption that the livestock use pattern is circular. X_2 is the radius in yards from water.

The Mueggler Equation is used in determining X_2:

$$X_2 = -1 \left[\frac{\text{Log}\,(X_1 - \hat{Y} + 107.06) - \text{Log}\,95.37}{\text{Log}\,(2.71828)\,.001}\right]$$

Mean allotment slopes were used for X_1, and relative use ($\hat{Y}$) was assumed to be 100% in solving the equation for X_2. When $\hat{Y}$ = 100%, all livestock are within Radius X_2.

The area inside Radius X_2 (A_{X_2}) was found by:

$A_{X_2} = \pi\,(X_2)^2K$

Where π = 3.14159.

X_2 = Radius in yards.

K = Conversion factor of square yards to acres (2.066×10^{-4}).

Area A was then "stocked" at the same rate as the proposed or existing grazing systems by using the following equation:

$$AM_{X_2} = \frac{AA_{X_2}}{TA} \times A_{X_2}$$

Where A = Accumulated acreage within X_2.

TA = Total used acres for that allotment (Chapter 3 soils section).

AA = AUMs for that allotment or pasture.

AM_{X_2} = AUMs within Area A of Radius X_2.

Actual use AUMs were used for existing conditions for each allotment. For the short and long term, the proposed AUMs were divided by the number of pastures to determine the use for each allotment. For seasonal maximum use, the percent of total proposed AUMs (TABLE 2D-1) were used.

The accumulative relative use ($\hat{Y}$) was incremented in 5% intervals from 100%. X_2 and A_{X_2} were calculated for each $\hat{Y}$ using the above equations.

Acres within each 5% relative use class were found by:

$AC = A_{X_2} - A(X_2\text{-}1)$

Where AC = Acres in each relative use class.

A_{X_2} = Accumulative acres in relative use class.

$A(X_2\text{-}1)$ = Accumulative acres in the relative class 5% lower than A_{X_2}.

Grazing intensity in acres per AUM was found by:

$$GI = \frac{AC}{(AM_{X_2} \times K)}$$

Where GI = Intensity in acres/AUM within each 5% relative use class.

AC = Actual acres within each 5% relative use class.

AM_{X_2} = Total AUMs for Area X_2.

K = .05 (5%) of the total AUMs for Area X_2 in each 5% relative use class.

TABLE 2D-2 shows the grazing intensity classes that were used.

The break points for the classes were found by a power curve fitting. The percent of total model acres in each intensity class was found, then the total allotment acres in each intensity class was estimated by:

$$AA = MA \times \frac{TA}{100}$$

Where AA = Allotment acres by intensity class.

MA = Percent acres by intensity class from circular model.

TA = Total acres used in allotment.

Grazing intensity near water was estimated by power curve fitting:

$GI = a\,X_2^b$

Where GI = Grazing intensity.

X_2 = Distance upslope from water.

a and b = Regression coefficients.

When the above relationship was found from the circular model data, intensity was found by determining GI where X_2 = 100 yards.

Existing grazing intensity was found using the above method, but it was assumed that livestock distribution would improve under the proposed grazing systems. Therefore, X_2 was increased 25% for future intensities; this means that with 0% slope, livestock would walk 2 miles from water under existing conditions and 2.5 miles under the conditions anticipated under the proposed grazing systems.

This methodology for estimated grazing use was programmed in Fortran IV for a Burroughs B1700 computer. Printed readouts of the computer calculations are available for review in the Rock Springs District Office.

Acres in each grazing intensity class by allotment are shown in TABLES 2-6 and 3-4. Acres in each grazing intensity class by pasture are available upon request from the BLM Rock Springs District Office. While TABLE 2-6 lists the relative grazing intensity near water in acres per AUM, relative intensity should be used only to compare the existing situation with the proposed action. Therefore, the intensity listed by pasture in TABLE 2D-3 is on a scale from 1 to 100 where 1 is the lowest relative grazing intensity in the Sandy area and 100 is the highest. Intensity in acres per AUM was converted to relative intensity by an exponential function:

$Y = ae^{bx}$

Where Y = Relative intensity.

x = Intensity in acres/AUM.

a = 112.34.

b = -1.66.

Pasture level detail of existing grazing intensities is available upon request from the Rock Springs District Office.

TABLE 2D-1

PROJECTED SEASONAL MAXIMUM USE UNDER PROPOSED SYSTEMS

Grazing System	Seasonal Maximum Use (% of Total Allotment AUMs)
Three-Pasture Rest-Rotation	50%
Two-Pasture Alternately Grazed	100%
Three-Pasture Deferred	33%
Four-Pasture Alternately Grazed	50%
Two-Pasture Deferred	50%

TABLE 2D-2

GRAZING INTENSITY CLASSES

Class	Acres/AUM
Slight to Marginal	Greater than 75.0
Light	16.0 to 75.0
Moderate	5.5 to 16.0
Heavy	2.0 to 5.5
Severe	Less than 2.0

TABLE 2D-3

RELATIVE GRAZING INTENSITY 100 YARDS FROM WATER
UNDER THE PROPOSED ACTION

Allotment	Pasture	Present Intensity	Mean Short Term	Maximum Mean for a Season Short Term	Mean Long Term
1. Bar X	1		67	67	69
	2		73	73	75
	3		77	77	79
TOTAL		92	72	72	74
2. Fish Creek	1		68	88	74
	2		64	85	69
TOTAL		65	66	86	71
3. Gold Creek	1		58	81	72
	2		22	50	37
	3		37	65	53
	4		89	100	95
TOTAL		44	39	66	55
4. Little Sandy-Little Prospect	1		51	66	58
	2		62	75	68
	3		42	59	48
	4		27	55	43
	5		32	60	48
TOTAL		59	47	65	65
5. Steamboat Mountain	1		1	1	4
	2		20	20	31
TOTAL		7	4	4	9
6. Little Colorado: Green River Use Area	1		92	98	98
	2		66	79	79
	3		81	91	91
AREA TOTAL		60	78	88	88
Farson Use Area	1		75	86	86
	2		64	77	77
	3		63	77	75
AREA TOTAL		60	66	79	78
Big Sandy Use Area	1		74	85	83
	2		44	60	56
	3		74	86	83
AREA TOTAL		60	59	73	71
7. Red Desert	1		73	85	77
	2		94	100	95
	3		75	86	79
TOTAL		3	77	88	81
8. Bush Rim	1		49	65	58
	2		18	33	26
	3		43	59	52
TOTAL		1	34	51	44
9. Continental Peak	1		57	72	60
	2		45	62	48
	3		47	64	50
TOTAL		35	50	66	52
10. Pacific Creek	1		19	34	26
	2		27	44	35
	3		36	52	44
TOTAL		10	26	43	34

TABLE 2D-3 (Continued)

RELATIVE GRAZING INTENSITY 100 YARDS FROM WATER
UNDER THE PROPOSED ACTION

Allotment	Pasture	Present Intensity	Mean Short Term	Maximum Mean for a Season Short Term	Mean Long Term
11. Sands	1		13	26	26
	2		3	10	9
	3		13	26	26
TOTAL		15	9	21	20
12. White Acorn	1		51	66	52
	2		72	83	73
	3		78	88	79
	4		54	78	56
	5		42	69	44
TOTAL		45	53	74	57
13. Prospect Mountain	1		61	75	68
	2		31	48	39
	3		33	50	41
	4		58	81	65
	5		18	45	25
TOTAL		42	36	57	44
14. Reservoir	1		91	73	63
	2		78	55	43
	3		88	69	59
TOTAL		67	85	65	53
15. Poston	1		47	64	51
	2		41	58	46
	3		66	79	69
TOTAL		49	50	65	53
16. Pine Creek	1		26	44	37
	2		37	54	48
	3		56	72	66
TOTAL		35	36	53	47

APPENDIX 2E

Methods Used to Determine Reservoir and Pit Evaporation

Evaporation is influenced by the shape of a reservoir or pit. Smith (1974) used a pyramid to approximate the shape of an earthfill reservoir and a prismoid to approximate the shape of a pit reservoir.

The assumption is made that reservoirs and pits fill each year. Net evaporation equals 3.33 feet per year (Smith 1974).

V = Volume in acre-feet when full.
V_E = Volume in acre-feet after a year's evaporation.
H = Height of water.
A = Area of water at water surface.
A_M = Area of water at midsection.
A_o = Area of water at bottom.

Reservoir Evaporation Per Year

$V = 1/3\ AH = 8.33$ acre-feet (reservoir full)
Where A = 2.5 acres.
H = 10 feet (see Chapter 1).
Side Slopes = 3:1 and $H_E = 10 - 3.33 = 6.67$ after evaporation.

$$V_E = \left(\frac{H_E}{H}\right)^3 V$$

$$V_E = \left(\frac{6.67}{10}\right)^3 8.33 = 2.47 \text{ ac-ft}$$

Evaporation per year = 8.33 - 2.47 = 5.86 ac-ft/yr

Pit Evaporation Per Year

$$V = \frac{H}{6}(A + A_A + 4\,A_M) = 3.42 \text{ acre-feet (pit full)}$$

Where A = 151 × 151 = .52 acres
A_M = 103 × 115 = .27 acres
A_A = 55 × 79 = .10 acres
$V = \frac{12}{6}(.52 + .10 + 4\,(.27)) = 3.42$ acre-feet

H = 12 feet (see Chapter 1).
Side Slopes = 4:1 for 2 sides and 3:1 for 2 sides. H = 10 - 3.33 = 6.67 after evaporation.

Therefore A = 124.4 × 131 = .37 acres
A_M = 89.7 × 105 = .22 acres
A_A = 55 × 79 = .10
$V_E = \left(\frac{8.67}{6}\right)(.37 + .10 + 4(.22)) = 1.93$ acre-feet

Evaporation/year = 3.42 - 1.93 = 1.49 acre-feet/year.

The average existing evaporation rate by reservoirs was assumed to be the mean of pits and reservoirs, or

$$\frac{(5.83)(63) + (1.49)(33)}{96} = 4.36 \text{ acre-feet/year.}$$

APPENDIX 2F

Sediment Yield Factors

Originally prepared by the Pacific Southwest Interagency Committee (PSIAC) Sedimentation Task Force, the procedure for estimating sediment yield is considered applicable to all Western areas administered by the Bureau of Land Management.

The nine factors considered in estimating sediment yield are listed in TABLE 2F-1. The numerical values represent the relative importance of each factor in the rating. See BLM Manual 7317.3 for further details.

APPENDIX 2H

Determination of the Percent Ground Cover

The following criteria are based on telephone conversations with Ron Clark, watershed specialist, BLM Nevada State Office.

1. A minimum of two grazing cycles with either rest-rotation or defined grazing systems on areas of 8 to 12 inches of rainfall is required before much vegetation response can be noted.

2. Areas with less than 8 inches rainfall require three or four grazing cycles to see any response, and the percent increase is less.

3. Increased plant density is not readily measurable where fibrous rooted plants are the dominant species in a vegetation type. More foliage will be produced as a result of increased vigor primarily. Increased foliage should produce more litter; therefore, some percent ground cover increase may be experienced.

4. Rhizomatous plants will increase in density in their response to a grazing system. More foliage will be produced.

5. Saltbush types respond quite well to low intensity winter sheep grazing but do not gain much under cattle grazing and under spring and summer use.

The primary factors considered in the percent ground cover changes described here for the allotments in the Sandy area were: (1) moisture availability; (2) physiological make-up of the plant species within a vegetation type; (3) grazing system and grazing treatments, and (4) season of use.

TABLE 2H-1 shows the percent ground cover and vegetal cover under current conditions, and TABLE 2H-2 indicates how the proposed action would affect the percent ground cover over the long term.

TABLE 2F-1

FACTORS CONSIDERED IN ESTIMATING SEDIMENT YIELD

Factor	Rating Range	Main Characteristics Considered
Surface Geology	0 to 10	Rock type Weathering Hardness Fracturing
Soils	0 to 10	Texture Caliche Aggregation Organic matter Shrink-swell Rockiness
Climate	0 to 10	Storm frequency, intensity, and duration
Runoff	0 to 10	Volume per unit area Peak flow per unit area
Topography	0 to 10	Steepness of upland slopes Relief Ford and floodplain development
Ground Cover	-10 to +10	Vegetation Understress Litter Rocks Understory development
Land Use	-10 to +10	Percent cultivated Grazing intensity Logging Roads
Upland Erosion	0 to 25	Rills and gullies Wind deposit in channels Landslides
Channel Erosion and Sediment Transport	0 to 25	Bank and bed erosion Channel vegetation Flow depths Active headcuts

APPENDIX 2G

STREAM CHANNEL STABILITY EVALUATION

This table was derived from the "R-1 Stream Channel Stability Field Evaluation Form." Each reach of stream is evaluated for each of the following items, and a number is given for each item. The numbers are then added for the channel stability rating.

Item Rated	Possible Points*				Stability Indicators
	E	G	F	P	
Upper Banks					
Landform Slope	2	4	6	8	Bank slope
Mass Wasting (Existing or Potential)	3	6	9	12	Evidence of mass wasting
Debris Jam Potential (Floatable Objects	2	4	6	8	Absent to heavy
Bank Protection from Vegetation	3	6	9	12	Plant cover
Lower Banks					
Channel Capacity	1	2	3	4	Width to depth ratio (W/D) and presence of overbank flow
Bank Rock Content	2	4	6	8	Percent of rock content
Obstruction Flow Deflectors Sediment Traps	2	4	6	8	Absent to frequent
Cutting	4	8	12	16	Size and frequence
Deposition	4	8	12	16	Presence or absence
Bottom					
Rock Angularity	1	2	3	4	Sharp, smooth, rounded
Brightness	1	2	3	4	Dull to bright
Consolidation or Particle Packing	2	4	6	8	Loose to tightly packed
Bottom Size Distribution and Percent Stable Materials	4	8	12	16	Evidence of sorting
Scouring and Deposition	6	12	18	24	Percent
Clinging Aquatic Vegetation (Moss and Algae)	1	2	3	4	Absent to abundant

* Excellent (E) = total value of less than 38; good (G) = 39 to 76; fair (F) = 77 to 114, and poor (P) = 115 or more.

TABLE 2R-1

AVERAGE PRESENT PERCENT GROUND COVER* AND VEGETAL COVER

Allotments	Vegetation Types: Sagebrush-Grass		Saltbush-Winterfat		Grass		Meadow	
	Percent Ground Cover	Percent Vegetal Cover	Percent Ground Cover	Percent Vegetal Cover	Percent Ground Cover	Percent Vegetal Cover	Percent Ground Cover	Percent Vegetal Cover
Bar X	48	17					94	30
Fish Creek	40	13					91	26
Gold Creek	33	17					73	23
Little Sandy-Little Prospect	39	19					86	30
Steamboat Mountain	49	11					60	22
Little Colorado	25	12	23	15	22	23	36	12
Red Desert	27	16	27	9	18	15		
Bush Rim	28	13	42	11	18	12	97	18
Continental Peak	47	16	16	7	18	16	97	19
Pacific Creek	40	14	68	8	47	12	81	17
Sands	29	13			32	16	65	23
White Acorn	54	16					77	29
Prospect Mountain	36	13					36	30
Reservoir	32	12					49	28
Foxton	28	13					91	30
Pine Creek	58	15					80	28

Allotments	Grassewood		Mountain Shrub		Perennial Forbs		Conifer	
Bar X								
Fish Creek								
Gold Creek			79	18			78	9
Little Sandy-Little Prospect			77	12				
Steamboat Mountain	56	12	79	18	18	6		
Little Colorado	28	11					27	12
Red Desert	22	6			10	9		
Bush Rim	14	16	64	19	16	12	78	9
Continental Peak	74	13	96	19	23	14		
Pacific Creek	22	21	96	16	11	12	76	11
Sands	14	12			11	17	76	8
White Acorn			53	14			78	11
Prospect Mountain			77	16			93	3
Reservoir								
Foxton								
Pine Creek								

* Ground cover percentages as determined by the Wyoming Interrated Study Procedures (available in Rock Springs District Office for review).

TABLE 2H-2

PERCENT GROUND COVER INCREASES FOR LONG TERM UNDER PROPOSAL*

Allotment and Grazing System	Sagebrush-Grass	Meadow	Conifer	Saltbush-Winterfat	Mountain Shrub	Perennial Forb	Grass	Greasewood
1. Bar X 3-Pasture Deferred	25	0	-	-	-	-	-	-
2. Fish Creek 2-Pasture Alternately Grazed	15	0	-	-	-	-	-	-
3. Gold Creek 4-Pasture Alternately Grazed	20	0	0	-	20	-	-	-
4. Little Sandy-Little Prospect 2-Pasture Alternately Grazed	10	0	0	10	5	-	-	-
3-Pasture Rest-Rotation	25	0	10	10	5	-	30	5
5. Steamboat Mountain 2-Pasture Deferred	25	0	-	10	5	0	30	-
6. Little Colorado-Green River Use Area 3-Pasture Rest-Rotation	20	-	0	10	-	-	10	5
Farson Use Area 3-Pasture Rest-Rotation	20	-	-	10	-	15	10	5
Big Sandy Use Area 3-Pasture Rest-Rotation	20	-	-	10	-	15	-	5
7. Red Desert 3-Pasture Rest-Rotation	20	-	-	10	-	15	10	5
8. Bush Rim 3-Pasture Rest-Rotation	20	0	0	10	10	15	10	5
9. Continental Peak 3-Pasture Rest-Rotation	20	0	-	10	10	5	5	5
10. Pacific Creek 3-Pasture Rest-Rotation	20	0	0	10	10	15	5	5
11. Sands 3-Pasture Rest-Rotation	20	0	0	10	10	15	10	5
12. White Acorn 3-Pasture Alternately Grazed	10	0	0	-	10	-	-	-
3-Pasture Rest-Rotation	20	0	0	-	-	-	-	-
13. Prospect Mountain 2-Pasture Alternately Grazed	20	0	0	-	10	-	-	-
3-Pasture Rest-Rotation	20	0	0	10	10	-	10	5
14. Reservoir 3-Pasture Rest-Rotation	20	0	-	-	-	-	10	5
15. Poston 3-Pasture Rest-Rotation	20	0	-	-	-	-	10	5
16. Pine Creek 3-Pasture Rest-Rotation	10	0	0	-	-	-	-	-

0 = 0% increase projected.

- = no projection made.

* Percent changes reflect soil association composition not identified through vegetation type mapping. Variances by soil mapping unit versus vegetation type may be present.

APPENDIX 2I

Methodologies for Determining Present and Predicted Forage Production, Forage Allocations, Range Condition, and Apparent Trend

Determination of Present Forage Production

An ocular reconnaissance method of range survey was conducted in 1964 to determine the grazing capacity of those rangelands in the Sandy grazing area. This method is a system of inventorying vegetation and estimating total forage density and percentage composition by species in a vegetation type. The first step in the survey consists of preparing detailed maps in which the various vegetation types are classified and outlined. The surveyors traverse an area making sufficient sample observations in each of the forage types to support a projection of the observations to the entire type area. The percentage of the area totally covered by vertical ground cover is estimated. The individual vegetation species are identified and the percentage of each to total composition is also estimated. The observations or samples are recorded on Standard Form 4412-1. The percentage of each species of plants which may be properly utilized by livestock without detriment to the range is established. This proper use factor (PUF) is established for each grazing animal in the area and each plant species found on the range. The PUFs are based on the study of the total composition of the range being surveyed. In computing the carrying capacity, the percentage composition of each species is multiplied by the PUFs for that species in order to arrive at a figure which is designated as the forage value factor (FVF).

The FVFs for all of the species covered by the range observation or analysis are totaled. The total, multiplied by the average density of all of the forage in the area observed, produces a forage acre factor (FAF). For example, an acre only one-quarter covered by vegetation (density equals 0.25) of which only one-half is properly edible by livestock (proper use factor equals 0.5) would have a forage acre factor of 0.125, or the equivalent of one-eighth of a forage acre. A forage acre (FA) is a theoretical acre of land totally covered with vegetation which can be entirely consumed by livestock without damage to the range. The forage acre requirement (FAR) is divided by the forage acre factor to arrive at the number of surface acres required to produce an animal unit month of usable forage for the forage type covered by the survey. The forage acre requirement is that portion of a forage acre required to sustain one animal unit for one month.

In order to complete the survey, the forage acres are converted into acres per animal unit months. This is accomplished by determining the amount of a forage acre that is required to sustain an animal unit (one cow or five sheep) for one month. This is determined by study of a controlled pasture which is of a type similar to the range being surveyed and determined on the same basis as that used for the range survey, and divided by the average animal use deemed to be proper to compute the FAR. The FAR is not a constant figure. It may vary in different surveys. These differences result from variations in the nutritive value of the forage, the proper use factors applied, and the estimating concepts and procedures used by the surveyors.

The following calculations were made to determine grazing capacities after field data were collected.

Calculations on Form 4412-1 (FIGURE 2I-1)

(1) PUF × percent composition = average PUF
(This step was done for each vegetative species recorded. If more than one species was recorded, the average PUF for each was added together at this point.)
(2) Total average PUFs × percent ground cover of usable forage = Forage Acre Factor for each grazing animal.

Calculations on the Range Survey Compilation Sheet (FIGURE 2I-2)

(3) Surface acres (SA) by type, section and ownership were obtained from 2-inch to the mile range survey type map.
(4) Surface area (SA) × Forage Acre Factor (FAF) = Forage Acre for each type in the section by class of animal.

Calculations on 4412-2 (FIGURE 2I-3)

(5) Forage acres (FA) divided by Forage Acre Requirement (FAR) = AUMs. This was done for each class of grazing animal using the area by section and ownership. This information was tabulated and summarized on Form 4412-2 (Figure 2I-3) for each allotment.

The range types identified during the 1964-1965 range survey were converted to groups of SCS ecological range sites. All subsequent calculations were made using data for the SCS range sites. Typical calculations are found in the Bar X example at the end of this appendix. Calculations were made using the fourth order soil survey and the range sites determined from the SCS *Technician Guide to Range Sites and Range Condition With Initial Stocking Rate* (TABLE 2I-1). The following steps were used to develop the range sites used in the Sandy area:

1. Determined the average carrying capacity by soil mapping unit using the SCS range site initial stocking notes for the range sites found in each soil mapping unit (TABLE 2I-1).
2. Soil mapping units with similar landform characteristics, precipitation, and carrying capacity were combined into one Sandy Range Site. The various combinations of soil types and range site classifications are found in TABLE 2I-2.
3. The Sandy Range Site numbers (RS1, RS2, etc.) are arbitrary numbers assigned for identification of the range sites used.

Total Forage Production in Pounds

Total forage production was converted into pounds of forage for each allotment as follows:

FIGURE 21-1

Form 4412-1 (November 1970)

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Writeup No. GB - 22

Date - 18 & 20 - 63

Aerial Photo No.

FORAGE SURVEY TYPE WRITEUP
(OCULAR RECONNAISSANCE METHOD)

Examiner	Hittle	KIND OF GRAZING ANIMAL *	SEASON OF USE	SECTIONS	TWP.	RGE.	MER.
Type	4 Arrr.						
Ac/AUM							

	SPECIES	TOTAL ALLOWABLE PUF	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	TA PUF	COMP. X TA PUF
GRASSES	Agda		5	50	.025	40	.020	5	.003	40	.020
	Sihy		4	50	.012	20	.008	5	.002	20	.008
	POA		3	50	.015	50	.015	10	.003	50	.015
	Orhy		2	50	.010	40	.008	10	.002	40	.008
	STIP		1	50	.005	20	.002	5	.001	25	.003
	SUBTOTAL		15								
FORBS	PHLO		6	0	-	10	.006	10	.006	10	.006
	ERIO		1	10	.001	20	.002	20	.002	20	.002
	ASTE		T								
	CAST		T								
	LOMA		T								
	SUBTOTAL		7								
SHRUBS	Artr		40	10	.040	20	.080	20	.080	20	.080
	Chui		9	10	.009	20	.018	20	.018	20	.018
	Eula		4	20	.008	30	.012	40	.016	30	.012
	Atco		9	10	.009	30	.027	30	.027	30	.027
	Atnu		2	20	.004	50	.010	30	.006	45	.009
	TETR		2	0	-	0	-	0	0	0	-
	Grsp		11	10	.011	30	.033	30	.033	30	.033
	$ATRI_2$		1	10	.001	30	.003	30	.003	30	.003
	SUBTOTAL		78								
	TOTALS		100		.150		.244		.202		.244

Av C PUF .150/.244 Av Den 17 = FAF .026 × ____ % Util = Net FAF ____ ; FAR ____ + Net FAF ____ = ____ Ac/AUM

Av S PUF .244 × Av Den 17 = FAF .041 × ____ % Util = Net FAF ____ ; FAR ____ + Net FAF ____ = ____ Ac/AUM

Av D PUF .202/.244 Av Den 17 = FAF .034 × ____ % Util = Net FAF ____ ; FAR ____ + Net FAF ____ = ____ Ac/AUM

Av TA PUF .244/.244 Av Den 17 = FAF .041 × ____ % Util = Net FAF ____ ; FAR ____ + Net FAF ____ = ____ Ac/AUM

TA-Total Allowable. Total Net FAF ____ ; FAR ____ + Net FAF ____ = ____ Ac/AUM

*Livestock and major game species. *(Other game species making inappreciable use are:* .)

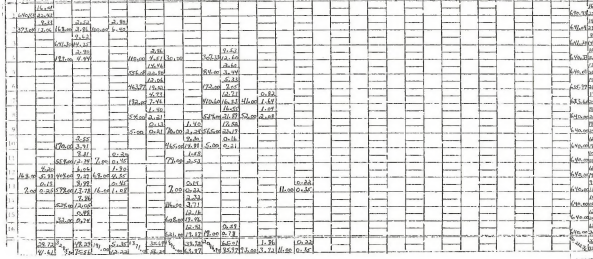
FIGURE 21-2

Range Survey Compilation Sheet

Township 25 N. Range 111 W. Date 7/15/66

Land Ownership Federal Allotment Page 1 of 1

Unit Little Colorado Types (Shadow and Designation)



Form 4412-2
(July 1965)
(Formerly 4-1701)

FIGURE 21-3
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Page of pages
Compiled by
Date

ALLOTMENT GRAZING CAPACITY TABULATION
(OCULAR RECONNAISSANCE METHOD)

District	Allotment	KIND OF ANIMAL	SEASON OF USE	Nation of Livestock and Major Game AUM Uses
Rock Springs	Little Colorado Unit			C ___ S ___ D ___ ___ ___

LOCATION			PUBLIC DOMAIN					OTHER FEDERAL LAND*					RANGE CONTROLLED BY USER**					RANGE NOT CONTROLLED BY USER***				
TWP.	RGE.	SEC.	SURFACE ACRES	AUM's C	S	P	D	SURFACE ACRES	AUM's C	S	P	D	SURFACE ACRES	AUM's C	S	P	D	SURFACE ACRES	AUM's C	S	P	D
25	111	1	640.4	337.2	36.8	30.4	38.0															
		2	641.0	434.1	38.2	30.7	38.8															
		3	641.3	082.4	20.2	20.0	25.0															
		4	640.3	357.0	36.9	27.1	38.2															
		5	640.0	259.7	41.0	34.7	44.5															
		6	635.9	760.4	42.7	33.4	44.2															
		7	633.6	062.5	42.3	30.9	43.9															
		8	640.0	064.2	42.9	29.9	44.3															
		9	640.0	064.3	38.0	28.4	43.4															
		10	640.0	027.9	31.1	26.1	32.3															
		11	640.0	023.5	25.8	21.3	26.6															
		12	640.0	028.3	32.0	25.8	32.6															
		13	640.0	021.2	25.6	21.0	26.4															
		14	640.0	023.7	25.8	21.4	26.7															
		15	640.0	029.4	33.1	27.9	34.2															
		16	640.0	090.3	33.9	28.3	35.0															
		17	640.0	026.6	37.3	28.4	39.5															
		18	638.5	762.7	42.6	30.8	43.8															
		19	637.3	630.5	34.5	29.0	33.6															
		20	640.0	030.0	33.7	28.1	34.9															
		21	640.0	072.8	33.6	28.1	34.9															
		22	640.0	029.3	33.2	28.7	34.8															
		23	640.0	029.6	33.7	30.2	31.9															
		24	640.0	020.2	33.6	31.1	36.7															
		25	640.0	033.1	36.8	34.6	38.2															
		26	640.0	034.3	37.6	33.0	39.1															
		27	640.0	041.2	41.7	34.8	43.6															
PAGE TOTALS			17266.6	891.1		776.1								955.2			988.0					
ALLOTMENT TOTALS																						

* Indicate type of Federal land and legal user (allottee) in listing
** Indicate ownership (State or private) and legal user (allottee) in listing
*** Indicate ownership (State or private) in listing

GPO 851-134

TABLE 21-1

GREEN RIVER AND GREAT DIVIDE BASINS
RANGE SITES AND RANGE CONDITION WITH INITIAL STOCKING RATE
Key Climax Plants and Others That Invade

Key Climax Plants		Maximum Percentages in Climax by Range Site (7-9" Precipitation Zone)														
Decreasers	Increasers	WL	Sb	SS	LL	SL	Sa	Sy	Lo	Cy	SwSy	SwLy	SH	VS	Sh	
Alkali Sacaton	Galleta grass						5	5								
Basin Wildrye	Inland saltgrass			5		10										
Bluebunch wheatgrass	Low sedges and rushes	15	10	10	5	5	5	5	5	5	5	5		10		
Indian rice-grass	Mat muhly		5	5		5										
Letterman needlegrass	Rhizomatous wheatgrass		10	5	20	d	d	25	30	d	d	d	d	d	d	
Nuttagrasses	Sandberg bluegrass				5	5	5	5	5	5	5	5		10		
Needle-and-thread	*Perennial forb	10	10	5	10	5	10	5	5	5	5	10	5	10	5	
Nuttall alkaligrass	Big sage-brush				5		5	15	20	15	5	5		5		
Prairie junegrass	Richfield sagebrush									5			5		10	
Redgrasses	Buffaloberry		5		10											
Simple wildrye	Cottonwood		5		30											
Slender wheat-grass	Greasewood			5		25							5			
Squirreltail	Greenmolly summercypress														10	
Tall sedges	Horsebrushes						5	5	5						5	
Tufted hair-grass	Juniper									Inv.		Inv.	Inv.	10		
Fescuing,	Low sagebrush										5		5			
Bitterbrush	**Rabbitbrushes		5	5	5	5	10	15	10	5	10	5		5		
Bud sagebrush	Aceas	5	5		5											
Fourwing salt-bush	Shadscale						10	5								
Gardners salt-bush	Shrubby cinque-foil		5													
	Silver sagebrush				5		10									
	Skunkbush				5	5								5		
	Spiny hopsage						10	5								
	Willows	10	10		5											
	Winterfat					d	d	d	d	d	d	d	15	d	d	
Total % Increasers Allowed																
Inward Condition Class		40	40	40	50	40	50	45	55	40	50	40	60	20	40	20

Range Condition	% Original Vegetation	Initial Stocking Rates by Site (AUMs/Acre)													
Excellent	76-100	2.60	1.80	1.20	0.40	0.30	0.13	0.20	0.20	0.20	0.12	0.12	0.20	0.10	0.07
Good	51-75	2.00	1.40	1.00	0.33	0.23	0.13	0.17	0.17	0.12	0.09	0.08	0.17	0.08	0.05
Fair	26-50	1.20	1.00	0.60	0.27	0.13	0.07	0.10	0.10	0.10	0.06	0.04	0.10	0.04	0.03
Poor	0-25	0.80	0.60	0.20	0.10	0.07	0.04	0.05	0.05	0.05	0.03	0.02	0.03	0.02	0.01

Legend:

*Count no more than 5% of any one species unless listed separately.
**Low rabbitbrush decreases with winter sheep use.
Blank - not important
d - Decreaser, all allowed
5, 10, etc. - Increaser. Percent count in climax.
Inv. - Invader on the site.
Decreaser Columns - These plants are decreasers on all sites on which they are found.

Invaders

All annuals
All snakeweed
Broom snakeweed
Cocks
Curlycup gumweed
Cactus
Foxtail barley
Thistles

Range Site Abbreviations Key

WL - Wetland
Lo - Loamy
Sb - Subirrigated
Cy - Clayey
SS - Saline subirrigated
Sa - Sands
SC - Saline upland
SL - Saline lowland
LL - Lowland
Sy - Sandy
SwSy - Shallow sandy
Sh - Shale
SwLy - Shallow loamy
VS - Very shallow

Source: Soil Conservation Service, "Technician Guide to Range Sites and Range Condition With Initial Stocking Rate." A description of each range site is available upon request from the Rock Springs District Office.

TABLE 2I-2

SANDY RANGE SITES

Site		Soil Types
RS1	Meadow	211, 210
RS2	Sagebrush-Grass	222, 223, 225
RS3	Steep, Shallow Sagebrush-Grass	221, 224
RS4	Mountain Sagebrush-Grass	320, 328
RS5	Conifer	350
RS6	Sagebrush-Grass (Shallow Arid)	124, 116
RS7	Sagebrush-Grass (Deep Arid)	123, 126
RS8	Steep Sagebrush-Grass (Arid)	121
RS9	Meadow (Arid)	110 (limited 210)
R10	Badlands/Dry Lake Bed	132, 119
R11	Greasewood-Grass (Alluvial Fans)	217
R12	Saltbush	115, 113, 127
R13	Steep Sagebrush-Grass	233
R14	Steep Sagebrush-Grass (Cold)	333
R15	Sagebrush-Grass (Alluvial Fans-Arid)	114, 117
R16	Greasewood-Saltbush Bottom	111
R17	Dune Sagebrush	143, 141
R18	Stable/Unstable Dune Association	142
R19	Active Sands	140
R20	Sagebrush-Grass (Alluvial Fan)	220, 228
R21	Mountain Meadow (Cold)	310

1. Average acres per AUM was established for each Sandy Range Site using carrying capacity determined by the ocular reconnaissance range survey method.
2. Average cattle PUFs was established for each Sandy Range Site from the type write-up sheets in the ocular reconnaissance range survey.
3. From information obtained from the University of Wyoming, it was assumed that an animal unit would be 780 pounds of forage per AUM.
4. An example of these calculations is found in the Bar X calculations at the end of this appendix. Total pounds of forage produced is summarized on TABLES 2-24 and 2-25 of Chapter 2.

Determination of Forage Allocation (Wildlife and Livestock)

After total AUMs for grazing animals were determined, the wildlife and wild horse needs were calculated. Information and recommendations from the Wyoming Game and Fish Department were used to determine wildlife needs and the draft wild horse management plans were used to determine the wild horse needs (see Bar X example). The AUMs reserved were then subtracted from the total AUMs available for livestock in order to determine the AUMs to be allocated for livestock. This is the proper grazing capacity, and it was calculated for each allotment.

Determination of Potential Forage Production and Use

Potential production for livestock use in the long term (23 years) was determined considering the present condition and grazing capacities of each allotment, its past use, and the grazing capacities assigned to a range site by the Soil Conservation Service (SCS) under the various ecological range site condition classifications. Predictions were made that most adequately represent the grazing capacity possible under the various grazing systems being proposed using the SCS ecological range site capacities, soil survey data, present range condition and trend, and personal knowledge of the analyzer of the area. The Bar X example shows how these calculations were made.

Maximum potential forage production in pounds of total forage was estimated as follows:

1. The average pounds that can be produced on each range site if the soil mapping unit is in excellent condition were calculated by converting initial stocking rate in AUMs taken from the SCS *Technician Guide to Range Sites and Range Condition with Initial Stocking Rate* into pounds of dry weight forage and averaged.
2. The average site production in pounds per acre was multiplied by the acreage in the range site to determine the maximum potential production in pounds.
3. This production potential is summarized in TABLE 2-26. An example of these calculations is in the Bar X example.

Long-term use for livestock is basically figured on the Class I qualifications held by the various livestock operators in the Sandy area. The grazing systems as proposed are expected to increase forage sufficiently such that these grazing qualifications can be acquired in the long term of 23 years.

Long-term use for wildlife is based on those numbers indicated as desirable population levels by herd unit by the Wyoming Game and Fish Department for this area. It is not expected that it will take the full 23 years to attain the desired population levels. BLM wildlife biologists estimate it would only take eleven years to attain these population levels.

Forage Production for Wildlife Species

Forage production determinations for wildlife species were based on the 1964-1965 Ocular Reconnaissance Survey. The following formula was used:

$$\frac{\text{Vegetation Subtype Acreage} \times \frac{\text{1 AUM}}{\text{780 Pounds of Dry Weight Forage}}}{\text{Average Cattle Proper Use Factor}}$$

$$\text{Subject Animal Average Proper Use Factor} = \frac{\text{Pounds of Animal Forage}}{\text{Pounds/AUM by Animal Species}} = \text{AUMs by Animal Species}$$

The formula used for determining pounds per acre for each animal species:

Forage Consumption/Day (Antelope—1.84 lbs.) (Deer—3.14 lbs.) (Elk—12.00 lbs.) (Moose—18.00 lbs.)		× 30 days ×
Animal Equivalent per AUM (14.6 Antelope/AUM) (1.5 Elk/AUM) (5.0 Deer/AUM) (1.0 Moose/AUM)	=	Pounds of Forage/AUM by Animal Species

Determination of Range Condition for Vegetation Types

Erosion condition classes and the classification of plant species as desirable, intermediate, and least desirable were used to determine range condition (FIGURE 21-4 and Bar X example). The following criteria were used in the plant classification process:

1. Desirable plants are those which are palatable, productive, and nutritious forage species, are often dominant under climax or near climax conditions, are long-lived, and have extensive root systems to aid in protecting the watershed against erosion. This category includes the important key forage species (grasses, forbs, browse, and shrubs) which are to be maintained or increased by intensive livestock management.

TABLE 21-3

CALCULATIONS FOR MAXIMUM POTENTIAL GRAZING CAPACITY IN POUNDS OF DRY WEIGHT FORAGE PER ACRE BY SANDY RANGE SITE

Sandy Range Site	Total Acres By Range Site In Sandy Area	Soil Mapping Unit	Acres Of Soil Mapping Unit By Range Site	Mapping Unit % Of Range Site 1/	Maximum Forage Produced: Average Pounds/Acre By Mapping Unit 2/	Maximum Forage Produced: Average Pounds/Acre By Mapping Unit For Site 3/	Total Pounds/Acre By Range Site 4/
RS1	19,345	211 210	15,360 4,185	79 21	2,640 2,860	2,086 601	2,687
RS2	163,240	222 223 225	74,760 74,435 14,045	46 46 8	1,050 1,110 1,155	483 511 92	1,086
RS3	53,245	221 224	39,150 14,095	74 26	915 840	677 218	895
RS4	34,845	320 328	22,820 12,025	65 35	1,820 1,560	1,183 546	1,729
RS5	59,425	350	59,425	100	960	960	960
RS6	463,725	124 116	451,175 12,550	97 3	345 410	335 12	347
RS7	354,005	123 126	294,055 59,950	83 17	435 400	378 68	446
RS8	105,335	121	105,335	100	320	320	320
RS9	10,095	110	10,095	100	1,700	1,700	1,700
R10	14,820	130 119	10,360 4,460	70 30	75 0	53 0	53
R11	4,625	217	4,625	100	675	675	675
R12	107,000	113 115 127	21,505 63,375 22,120	20 59 21	420 450 90	84 266 19	379
R13	65,570	233	65,570	100	870	870	870
R14	7,595	333	7,595	100	1,200	1,200	1,200
R15	38,090	114 117	13,165 24,925	35 65	500 450	175 293	468
R16	43,275	111	43,275	100	1,460	1,460	1,460
R17	70,765	141 143	24,305 46,460	34 66	500 473	170 312	482
R18	26,420	142	26,420	100	250	250	250
R19	20,100	140	20,100	100	0	0	0
R20	88,305	220 228	61,095 27,210	69 31	500 1,060	345 329	674
R21	3,470	310	3,470	100	9,700	9,700	9,700

1/ Computed by dividing mapping unit acres by the total acres in the respective Sandy Range Site.
2/ From detailed soils analysis available for review in the Rock Springs District Office.
3/ Computed by multiplying the average pounds per acre for mapping unit by the percent of the mapping unit in the respective Sandy Range Site.
4/ Sum of the average pounds per acre for the mapping units within the Sandy Range Site.

FIGURE 2I-4

RANGE CONDITION CLASSIFICATION

District: Rock Springs | Transect No. B-8

Resource Area: Green River | Vegetation Subtype: 041 Sagebrush grass

Allotment: Reservoir

Species		Composition	Cattle			Sheep			Wild Horses		
			D	I	L	D	I	L	D	I	L
Grasses:	Orhy	5	5				5		5		
	Subtotal	5									
Forbs:											
	CARE	5		5			5			5	
	Phmu	5					5				
	Subtotal	10									
Browse:											
	Artr										
	Chui	69					69			69	
		16		16			16				
	Subtotal	85									
	Total		5	21			100		5	74	

*Plant desirability categories, Desirable (D) and Intermediate (I)

Livestock Class	% Desirable + Intermediate = Total	Condition Class
Cattle	5 + 21 = 26	Fair
Sheep	0 + 100 = 100	Fair
Wild Horses	5 + 74 = 79	Fair

Soil Surface Factor = 32

2. Intermediate plants are of secondary importance in the climax and are usually associated with, or indicators of, ecological successional stages. They replace the desirables as condition deteriorates and replace the least desirables as condition improves. They may be less palatable to grazing animals or be more resistant to grazing use.

3. Least desirable plants include those that are definitely the poorer species in an ecosystem and consist principally of annuals, invaders, and noxious and low-value forage plants.

The erosion condition classes and the above plant classifications result in the following range condition criteria:

1. Good Condition: Composition is 40 percent or more of both desirable and intermediate species wit' at least 20 percent made up of desirable species. Erosion condition class is slight to stable.

2. Fair Condition: Composition is 15 to 39 percent of desirable and intermediate species with 5 or more percent made up of desirable species. Erosion condition class is less than critical. Also, those ecosystems where the composition comprises 60 percent or more of intermediate species and less than 5 percent of desirable species will be rated fair condition when the erosion condition class is moderate to stable.

3. Poor Condition: Composition is less than 15 percent desirable and intermediate species. Erosion condition class is critical to severe. (It should be noted that if the erosion condition class is critical to severe, the site is rated in poor condition regardless of the plant composition?)

Determination of Predicted Range Condition for Vegetation Types

Changes recorded in studies cited in Chapter 3 were used to help estimate expected changes as a result of some of the conclusions drawn for these studies and statements made in Chapter 3, the following assumptions were made to predict changes in range condition over a long term under the proposed action.

Rest-Rotation System

1. All meadow types would change to good condition.
2. All sagebrush-grass and mountain sagebrush types would change one class in range condition.
3. The saltbush type would have a 50% increase in range condition.
4. The greasewood, conifer, waste, and barren types would remain unchanged in condition.

Alternately Grazed System

1. Range condition would remain the same in all vegetation types with the exception of those in Paragraph 2 below.
2. Range condition would improve 25% on the two upper pastures of the Gold Creek Allotment.

Deferred Rotation System

1. Range condition would improve 50% in the meadow types.
2. Range condition on all other vegetation types would improve 25% except for the greasewood, waste, and barren types, which would not change.

Determination of Apparent Trend for Vegetation Types

Apparent trends in range condition describe the progressive patterns of significant changes in range condition which are gradually occurring over a period of years. Trends may be upward, downward, or static. Trend determination depends on a comparison of present with previous conditions. Apparent trend can be measured by using indicators such as vigor of plants, presence of young plants, presence of plant distribution, surface litter, gullies and soil movement.

A combination of the Deming two-phase method of determining range condition and trend and the rating system used in the BLM Salmon, Idaho District, were used to set up the criteria shown in FIGURE 21-5 for determining apparent trend in the field. FIGURE 21-5 also shows an example of an actual field rating. If the total numerical rating falls within the 51 to 35 category, the apparent trend of the range is classified as upward, 34 to 18, apparent trend is classified static, and 17 to 6, apparent trend is classified downward.

Sample sites for rating apparent trend were randomly selected in the office within each Sandy Range Site. The examiners in the field gave a numerical rating for various indicator categories. The apparent trend rating for each grazing animal was then transferred to a map and averages were tabulated by allotment.

APPENDIX 2J

Procedure for Determination of Big Game Habitat Condition

1. Plants identified as occurring in the area during the 1975 Rock Springs Survey were used in the Wyoming Integrated Study Procedure, available for review in the Rock Springs District Office.

2. The plant species were determined to be desirable (D), intermediate (I), or least desirable (L) by big game species (TABLE 2-39).

3. Using the 1976 Rock Springs District Proper Use Table, "D", "I", and "L" were determined as follows:

D = An averaged value of 40-60 for the two highest seasonal values on the proper use table.

I = An averaged value of 20-39 for the two highest seasonal values on the proper use table.

L = An averaged value of less than 20 for the two highest seasonal values on the proper use table.

4. The plant species and percent composition as they occurred in the integrated study were listed by transect. A field report was prepared on each vegetation subtype in each transect, including an office summary sheet from which data were taken for analysis.

5. The classification of good, fair, or poor was given each transect. These ratings were determined for each big game species by: (1) determining percent composition for each plant species by desirability and (2) consideration of the soil surface factor (SSF, see glossary). The SSF was plotted on a horizontal graph scale and the composition/desirability value was plotted on a vertical graph scale. The point where the two met indicated the condition classification by transect.

BAR X ALLOTMENT - TYPICAL VEGETATION PRODUCTION METHODOLOGY

Sandy Range Site Description and Acreages

RS1: Meadow Type
RS2: Sagebrush-Grass
RS3: Steep, Sagebrush-Grass

Pasture 1	Acres
RS1	122
RS2	1,798
RS3	204

Pasture 2	Acres
RS1	208
RS2	2,335

Pasture 3	Acres
RS1	244
RS2	1,984

Vegetation Subtypes, Average Proper Use Factors, and Average Grazing Capacities by Sandy Range Site

Site	Soil Types	Vegetation Types*	Type Number	Proper Use Factors (PUFs)** C	D	A	E	M	Grazing Capacity Cattle Ac/AUM	Sheep Ac/AUM
1	210	2(d) Salix Ante	Z-213	.149	.124	.070	.233	.084	5.3	6.1
2	222	4 Artr Pose Chvi	Z-218	.165	.142	.123	.236		8.0	8.5
		4 Artr Pose Agda	Z-217	.166	.155	.135	.243		10.4	9.3
	223	4 Artr Agrar	JH-138	.097	.182	.173	.207		16.0	10.4
		4 Artr Agsp Poa	Z-215	.163	.137	.120	.220	.0205	7.7	8.0
	225	4 Artr Phlo Pose	Z-214	.095	.144	.138	.164		18.5	13.3
3	221	4 Artr Agsp Poa	Z-215	.163	.137	.120	.220	.0205	7.7	8.0

Average PUFs -	C	D	A	E	M
RS1	.149	.124	.070	-	.084
RS2	.130	.160	.150	-	.021
RS3	.163	.137	.120	-	.021

Average Acres/AUM -	Cattle	Sheep
RS1	5.3	6.1
RS2	12.0	9.2
RS3	8.0	8.0

* Abbreviations refer to types. A complete list of plant species is available at the Rock Springs District Office.

** C - Cattle, D - Mule Deer, A - Pronghorn Antelope, E - Elk, M - Moose.

Total Vegetation Production

Site 1

Type Writeup No.	Ac/AUM	# 1 range/AUM	AvCPUF
Z-213	5.3	780	.149

780 ÷ 5.3 = 147 lb./acre
147 ÷ 0.149 = 987 lb./acre (total)

Pasture 1 - 122 Ac. x 987# = 120,414# ÷ 780 = 154 AUMs
2 - 208 Ac. x 987# = 205,296# ÷ 780 = 263 AUMs
3 - 244 Ac. x 987# = 240,828# ÷ 780 = 309 AUMs

Site 2

Z-215	8	780	.163	
JH-138	16	780	.097	
	2 24 = 12		2 .260 = .130	

780 ÷ 12.0 = 65 lb./acre
65 ÷ 0.130 = 500 lb./acre (total)

Pasture 1 - 1,798 Ac. x 500 = 899,000 ÷ 780 = 1,153
2 - 2,335 Ac. x 500 = 1,167,500 ÷ 780 = 149

Site 3

Z-215	7.7	780	.163

780 ÷ 7.7 = 101 lb./acre
101 ÷ 0.163 = 620 lb./acre (total)

Pasture 1 - 204 Ac. x 620 lb./Acre = 126,480# ÷ 780 = 162 AUMs

Present Sandy Range Site Production (Livestock)

Pasture	Site	Acreage		Cattle AUMs	Sheep AUMs
1	1	122		23 (5.3 Ac/AUM)	20 (6.1 Ac/AUM)
	2	(.29) 1,798	248	199	246
	3	204		26	26
2	1	208	299	39	34
	2	(.38) 2,335		260	323
3	1	244	272	46	40
	2	(.33) 1,984		226	280
				819	969

Cattle		Sheep	
	(Allot. Graz.)		(Allot. Graz.)
23	819 AUMs Recognized (Cap. Tab.)	20	969 AUMs Recognized (Cap. Tab.)
26	134 AUMs Sites 1 & 3	26	120 AUMs Sites 1 & 3
39	685 Balance in Site 2	34	849 Balance in Site 2
46		40	
134 AUMs		120 AUMs	

Acreage Of Site 2		Cattle	Sheep
6,117	(.29) 1,798	685	849
		.29	.29
		199	246
6,117	(.38) 2,335	685	849
		.38	.38
		260	323
6,117	(.33) 1,984	685	849
		.33	.33
		226	280

Present Site Production (Wildlife) - Ac/AUM

Information Needed to Develop Production Figures

C Ac/AUM by Site - From Total Production Section
Average C PUF - From Type Writeups Used in Total Production Section - Found in First Step of Productivity
Average W/L PUF - From Type Writeups Used in Total Production Section - Found in First Step of Productivity Development
Pounds of Forage Consumed/Animal/Day - Antelope - 1.84#, Deer -3.14#, Elk - 12.00#, Moose - 18.00#
Pounds of Forage/W/L AUM - Antelope - 806#, Deer - 471#, Elk - 540#, Moose - 540#

Formula for Determination

$$\left(\frac{\text{Sandy Range Site Acreage} \times \frac{\text{lbs./AUM}}{\text{C Ac/AUM}}}{\text{Average C PUF}}\right)(\text{W/L PUF}) = \frac{\text{lbs. of W/L Forage}}{\text{lbs./AUM by Species}} = \text{Wildlife AUMs}$$

$$\frac{\text{Range Site Acreage}}{\text{W/L AUMs}} = \text{Ac/AUM for that species}$$

Method for Determination

lbs./AUM by Species = Forage Consumption/Day x 30 Days x Animal Equivalent -
(Antelope - 14.6)
(Mule Deer- 5.0)
(Elk - 1.5)
(Moose - 1.0)

Site 1 - C Ac/AUM ÷ 5.3 Av. C PUF = .149

Antelope - $\left(\frac{120{,}501}{122 \text{ Ac} \times \frac{780\#}{5.3}} \div .149\right)(.070) = \frac{8{,}435}{806} = 11 = 11$ Ac/AUM W/L PUFs A - .070, D - .124, E - .233, M - .084

Deer - $120{,}501 \times .124 = \frac{14{,}942}{471} = 32 = 4$ Ac/AUM

Moose - $120{,}501 \times .084 = \frac{10{,}122}{540} = 19 = 6$ Ac/AUM

Site 2 - C Ac/AUM ÷ 12 Av. C PUF = .13

Antelope - $\left(\frac{899{,}000}{1{,}798 \text{ Ac} \times \frac{780\#}{12}} \div .13\right)(.150) = \frac{134{,}850}{806} = 167 = 11$ Ac/AUM W/L PUFs A - .150, D - .160, M - .021

Deer - $899{,}000 \times .160 = \frac{143{,}840}{471} = 305 = 6$ Ac/AUM

Moose - $899{,}000 \times .021 = \frac{18{,}879}{540} = 35 = 51$ Ac/AUM

Site 3 - C Ac/AUM ÷ 8 Av. C PUF = .163

Antelope - $\left(\frac{122{,}025}{204 \text{ Ac} \times \frac{780\#}{8}} \div .163\right)(.120) = \frac{14{,}643}{806} = 18 = 11$ Ac/AUM W/L PUFs A - .120, D - .137, M - .021

Deer - $122{,}025 \times .137 = \frac{16{,}717}{471} = 35 = 6$ Ac/AUM

Moose - $122{,}025 \times .021 = \frac{2{,}563}{540} = 5 = 41$ Ac/AUM

Present Use by Animal Class*

Livestock and Wild Horses

Cattle & Horses	Sheep	Wild Horses
883	72	0

Wildlife

Antelope AUMs	Mule Deer AUMs	Elk AUMs	Moose AUMs
36	112	16	0

* Information from AMP.

Sandy
Range Site Condition (Livestock)

	Cattle (Acres)			Sheep (Acres)		
	Good	Fair	Poor	Good	Fair	Poor
Pasture 1						
RS1	60	30	32	62	60	-
RS2	500	0	1,298	798	1,000	-
RS3	0	0	204	0	204	0
Pasture 2						
RS1	0	208	0	-	208	-
RS2	0	500	1,835	400	1,935	-
Pasture 3						
RS1	0	244	0	-	244	-
RS2	0	1,984	0	1,784	200	-

Sandy
Range Site Condition (Wildlife)

	Pronghorn Antelope (Acres)				Mule Deer (Acres)				Elk (Acres)				Moose (Acres)			
	Good	Fair	Poor	Marg	Good	Fair	Poor	Marg	Good	Fair	Poor	Marg	Good	Fair	Poor	Marg
Past. 1																
RS1	72	50	-	-	72	50	-	-	-	-	-	122	-	122	-	-
RS2	1,673	125	-	-	1,673	125	-	-	-	-	-	1,798	1,340	125	-	383
RS3	154	50	-	-	154	50	-	-	-	-	-	204	-	-	-	204
TOTAL	1,899	225	-	-	1,899	225	-	-	-	-	-	2,124	1,340	247	-	537
Past. 2																
RS1	208	-	-	-	208	-	-	-	-	-	-	208	-	208	-	-
RS2	2,335	-	-	-	2,335	-	-	-	-	-	-	2,335	700	-	-	1,635
TOTAL	2,543	-	-	-	2,543	-	-	-	-	-	-	2,543	700	208	-	1,635
Past. 3																
RS1	244	-	-	-	244	-	-	-	-	-	-	244	-	244	-	-
RS2	1,859	125	-	-	1,984	-	-	-	-	-	-	1,984	-	125	-	1,859
TOTAL	2,103	125	-	-	2,228	-	-	-	-	-	-	2,228	-	369	-	1,859
Allotment Total	6,545	350	-	-	6,670	225	-	-	-	-	-	6,895	2,040	824	-	4,031

Soil Productivity*

Site	Site Designation
Pasture 1	
RS1	H to M
RS2	M to L
RS3	L
Pasture 2	
RS1	H to M
RS2	M to L
Pasture 3	
RS1	H to M
RS2	M to L

* Very High (VH), High (H), Moderate (M), Low (L), Very Low (VL)

Erosion Condition Class

	Stable	Slight	Moderate	Critical
Pasture 1				
RS1	122			
RS2		1,798		
RS3		204		
TOTAL	122	2,002	0	0
Pasture 2				
RS1	208			
RS2		2,335		
TOTAL	208	2,335	0	0
Pasture 3				
RS1	244			
RS2		1,984		
TOTAL	244	2,984	0	0
ALLOTMENT TOTAL	574	6,321		

Information comes from URA (Present Erosion Condition Class) Overlay.

Present Apparent Trend

Sandy Range Site		Cattle (Acres)			Sheep (Acres)		
		Upward	Static	Downward	Upward	Static	Downward
Pasture 1							
RS1		-	122	-	-	122	-
RS2		-	1,798	-	-	1,798	-
RS3		-	204	-	-	204	-
	Total	0	2,124	0	0	2,124	0
Pasture 2							
RS1		-	208	-	-	208	-
RS2		-	2,335	-	-	2,335	-
	Total	0	2,543	0	0	2,543	0
Pasture 3							
RS1		-	244	-	-	244	-
RS2		-	1,984	-	-	1,984	-
	Total	0	2,228	0	0	2,228	0

Predicted Sandy Range Site Condition in 23 Years Based on Future Management Predictions

Range Site	Cattle and Horses			Sheep		
	Good	Fair	Poor	Good	Fair	Poor
Pasture 1						
RS1	-	122	-	-	122	-
RS2	-	600	1,198	-	1,798	-
RS3	-	--	204	-	204	-
Total	-	722	1,402	-	2,124	-
Pasture 2						
RS1	-	208	-	-	208	-
RS2	-	600	1,735	-	2,335	-
Total	-	808	1,735	-	2,543	-
Pasture 3						
RS1	-	244	-	-	244	-
RS2	-	1,984	-	-	1,984	-
Total	-	2,228	-	-	2,228	-
Allotment Total	-	3,758	3,137	-	6,895	-

Long-Term Production Determination

R.S.	Description	Current Grazing Capacity Acres/AUM Cattle	Sheep	Predicted Grazing Capacity Acres/AUM Cattle	Sheep
1	Meadow	5.3	6.1	2.0	3.0

This site, according to the SCS range site guide, is currently below the 3 Ac/AUM poor condition rating. The site is basically in fair condition for both classes of livestock according to the BLM range condition system. Considering the type of management being proposed for this allotment, three-pasture deferred, this site would be expected to improve to approximately 2 Ac/AUM for cattle and 3 Ac/AUM for sheep.

2	Sagebrush-Grass	9.0	77.0	8.0	6.0

The SCS range site guide rates this site as having a grazing capacity of from 6 Ac/AUM (fair condition) to 12 Ac/AUM (poor condition). Current grazing capacity for the site averages approximately 9 Ac/AUM for cattle and 7 Ac/AUM for sheep, which puts it between the two SCS ratings. BLM range condition rating for the site indicates that a considerable acreage is in poor condition for cattle but in fair to good for sheep. The cattle potential here doesn't appear to be extensive, although it is quite good already for sheep. Little improvement would be expected for either animal class on this site.

3	Steep, Shallow Sagebrush-Grass	7.7	8.0	6.0	6.0

The current average grazing capacity for this site is rated between the fair and good SCS ratings of 10 Ac/AUM and 6 Ac/AUM, respectively. BLM range condition ratings indicate that this site is currently in poor cattle condition but fair for sheep. Due to the character of the site and the present grazing capacity there, limited improvement from the current situation is expected.

Long-Term Use (23 Years) With Proposed Action

Livestock

468 AUMs NRL 49%
488 AUMs Private 51%

956 TOTAL

Cattle & Horses AUMs	Sheep AUMs	Wild Horses
880	76	0

$\frac{468}{.49} = \frac{x}{.51}$ $\quad x = 488$

$956 \times .92 = 880$ Cattle & Horse AUMs

Cattle Use % $\frac{956}{880}$ 76

Wildlife

Antelope AUMs	Mule Deer AUMs	Elk AUMs	Moose AUMs
38	146	16	0

Long-Term Production (23 Years) With Proposed Action

Pasture	Site	Acreage	Present Grazing Capacity Cattle	Present Grazing Capacity Sheep	Predicted Grazing Capacity Cattle	Predicted Grazing Capacity Sheep	Cattle AUMS	Sheep AUMS
1	1	122	5.3 Ac/AUM	6.1 Ac/AUM	2	3	61	41
	2	1,798	9.0 Ac/AUM	7.0 Ac/AUM	8	6	225	300
	3	204	7.7 Ac/AUM	8.0 Ac/AUM	6	6	34	34
							320	375
2	1	208	5.3 Ac/AUM	6.1 Ac/AUM	2	3	104	69
	2	2,335	9.0 Ac/AUM	7.0 Ac/AUM	8	6	292	389
							396	458
3	1	244	5.3 Ac/AUM	6.1 Ac/AUM	2	3	122	81
	2	1,984	9.0 Ac/AUM	7.0 Ac/AUM	8	6	248	331
							370	412

Divide RS2 acreages by present production for that site:

Cattle

$\frac{1798}{199}$ = 9.0 Ac/AUM (Site 2)

Sheep

$\frac{1798}{246}$ = 7.0 Ac/AUM (Site 2)

This gives average Ac/AUM for that site based on recognized use for the allotment. Ac/AUM is not a representative figure in this case due to differences in AMP acreage figures and ES acreage figures. It is used anyway as increase shown here should be fairly representative.

Use With Proposed Action by Animal Class

Cattle & Horses			Sheep			Wild Horses	Total AUMs
NRL	Private	Total	NRL	Private	Total		
362	378	740	32	33	65	0	805

Private AUM Determination

$\frac{362}{.49} = \frac{x}{.51}$ $\qquad$ $\frac{32}{.49} = \frac{x}{.51}$

.49x = 185 $\qquad$ .49x = 16

x = 378 private $\qquad$ x = 33

Total AUMs as proposed from TABLE 1-4 (NRL) use.
Determine % Federal range from AMP.
Determine private AUMs.
Then total.

Wildlife Use Under Proposed Action

Antelope AUMs	Mule Deer AUMs	Elk AUMs	Moose AUMs
36	112	16	0

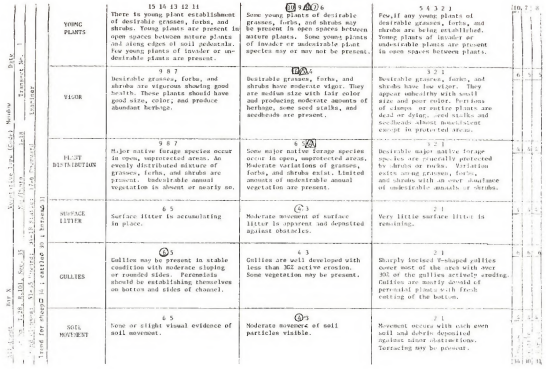
Productivity Potential

Pasture	Sandy Range Site	Acres Of Range Site	Maximum Potential In Acres/AUM	Average Pounds Per Acre	Total AUMs	Total Pounds Of Forage Produced
1	RS1	122	0.86	2,687	142	327,814
	RS2*	1,798	2.99	1,086	601	1,952,628
	RS3	204	5.00	895	41	182,580
Pasture Total					784	2,463,022
2	RS1	208	0.86	2,687	242	558,896
	RS2	2,335	2.99	1,086	781	2,535,810
Pasture Total					1,023	3,094,706
3	RS1	244	0.86	2,687	284	655,628
	RS2	1,984	2.99	1,086	664	2,154,624
Pasture Total					948	2,810,252
GRAND TOTAL FOR ALLOTMENT					2,755	8,367,980

*Site 2 - Soil type average maximum potentials for 222, 223, and 225 were averaged for the 2.99 Ac/AUM potential.

FIGURE 21-5

TYPICAL RANGE CONDITION AND TREND RATING SYSTEM



6. The location of each transect was plotted on a one-half inch to one mile overlay map. This map was placed over an overlay showing the vegetation subtype lines of the Sandy area.

7. The good (green), fair (blue), and poor (red) for each subtype was colored on the overlay.

8. An overlay showing allotment boundaries was placed on the classification overlays for each big game species and the acreages of good, fair, and poor were determined by allotment.

APPENDIX 2K

Determination of Visual Contrast Ratings

Contrast ratings are prepared on a standard form as shown in FIGURE 2K-1. Contrast ratings are made from a normal observation position where a change has the most visual influence.

Contrast ratings are determined by "feature"; that is, each component part of a landscape which could be affected by change: land (and water), vegetation, and the addition of structures. Changes to the existing landscape character are broken down in each feature as changes to "form," "line," "color," and "texture." Numbers have been assigned to each of these elements (BLM Manual 6320.31) on a scale from 4 for form to 1 for texture. Each of these is weighted by a multiplier that indicates degree of contrast (3 = strong to 1 = weak) and added for a total feature score. This score is compared with the score developed through the VRM rating system assigned to each objective management class. Maximums for each class are: Class II—10 maximum for each feature, 2 maximum for each element; Class III—16 maximum for each feature, 2 maximum for each element; Class IV—20 maximum for each feature.

Contrast ratings were prepared for each type of activity expected under the proposed action and each alternative for the "worst case" in each of the landscape types. The ratings for the proposed action are shown in TABLE 3-58. A detailed analysis is available for review in the Rock Springs District Office.

Assumptions are made in preparation of the contrast rating for the worst possible effect of a change considering the angle of sunlight, seasonal change in the landscape character, motion, etc.

Contrast ratings measure the visibility of a change in the landscape rather than judging the sociological or psychological overtones implied by that change; however, in terms of scenic beauty, the ability to blend well with the natural characteristics of the land is of aesthetic impact.

APPENDIX 3A

Methods Used to Determine Infiltration Rates and Runoff

Infiltration Rate

Gifford and Hawkins (1976) found through literature review that there is no influence of grazing on infiltration. Ungrazed infiltration rates were statistically different from grazed.

The soil survey of the Sandy area listed infiltration rates by soil subgroups within mapping units (TABLE 2-2). Infiltration rates for soil association were calculated by the percent of each soil series within a mapping unit. Soil associations were combined by major vegetation types in each allotment or pasture. A weighted infiltration rate was calculated by allotment or pasture acres within a soil mapping unit. Vegetal cover was taken from the Sandy Integrated Range Survey.

Infiltration rates under the existing condition and the proposed action were found by simulating grazing cycles.

Gifford and Hawkins (1976) developed linear regression equations to predict infiltration rates under light to moderate and heavy grazing.

Equation 1: $f_L = .397 + .562\ f_o$

Equation 2: $f_H = .423 + .247\ f_o$

Where f_L = Infiltration rate in lightly to moderately grazed areas.

f_H = Infiltration rate in heavily grazed areas.

f_o = Infiltration rate in ungrazed area (assumed to be the infiltration rates taken from the soil survey for the Sandy area).

Gifford, Hawkins, and Williams (1975) used a linear curve to predict a recovery in infiltration rates during a rest period.

Equation 3: $f_R = f + (f_o - f)\ t/T$

Where f_R = Infiltration rate at end of rest.

f = Infiltration rate at beginning of rest period.

t = Rest time in years.

T = Time for full recovery in years (assumed to be 10 years for Sandy).

Existing infiltration rates were determined by applying the mean infiltration rate (f_o) for each major vegetation type in the allotment to Equations 1 and 2 to find f_L and f_H. The allotment was then "rested" for t = .63 years, with Equation 3 (f_L and f_H = f) used to determine recovery. This cycle was repeated until a consistent f_L, f_H, and f were found (generally two to five years, depending on the allotment). It was found that in the first grazing period f_R equalled f_o for Equations 1 and 2. Minimum (grazed) and maximum (ungrazed) infiltration rates were found for heavy and moderate to light grazing for each vegetation type in each allotment.

Determination of infiltration rates for the proposed action was made using the techniques described for existing conditions, except the f_o value for the first grazing cycle was the maximum found under existing conditions. The proposed action would be implemented after a winter rest period. The length of rest (t) proposed for each grazing system is shown in TABLE 3A-1.

The grazing-rest sequence was determined for eleven years, then infiltration rates were estimated for heavily grazed, moderate to lightly grazed, and ungrazed areas: for the ungrazed areas, f = f_o (Soil Inventory Rates). For moderate to lightly and heavily grazed areas, the minimum and maximum for the last (eleventh) year were recorded.

FIGURE 2K-1

VISUAL CONTRAST RATING

MANUAL REFERENCE 6320

1.
District Rock Springs Name of Evaluator C. Horman
Project Name Sandy Grazing E.S. Activity
Planning Unit Sandy Twp. Rge. Sec.
VRM Management Class (MP Map) II, III, IV Date 1976
Colorado / Sandy Landscape Type - Typical
Project Description (Action, Size, Volume, Permeability, Alignment, etc.)
Ind. in chapt. 2. of document

2. CHARACTERISTIC LANDSCAPE (Describe Also Specific)
Land / Water Body
Form Rolling
Line Indistinct, drainages steep sloped and marked by shadow lines some straits seen
Color Brown - lt Brown on river cuts
Texture Fine
Vegetation sage predominates
Form low
Line subtle
Color Grey - Grey green, value - medium
Texture Fine to moderate.
Structures Roads, gas wells, oil development, reservoirs, etc. (Only if structures aren't present)
Form Varies, linear, few breaks in topography but indistinct for relieving views of structures
Line
Color Black (oil pumps), white (thick tanks & propane tanks), brown-beige (roads)
Texture fine to coarse

3. ~~PROPOSED ACTIVITY~~ DESCRIPTION - EXISTING USE
Land / Water Body Describe in Terms of F.L.C.T. Introduced
Form Headcutting below the line of sight
Line Sharp edges on trampled banks
Color Dk. brown - disturbance of bottom water is murky
Texture Fine to coarse.
Vegetation Describe in Terms of F.L.C.T. Introduced
Form willows in poor shape
Line
Color lt. brown near water (due to trampling)
Texture
Structures Roads (Only if Structures Not Present) Describe in Terms of F.L.C.T. Introduced
Form linear, appear vertical or oblique on hillsides - many roads
Line edges of road distinct
Color lt brown to brown
Texture fine

4. CONTRAST RATING 3-Strong; 2-Moderate, 1-weak

		Degree of Contrast	VRM Mgt. Class Met.
Land			
Form	4	n/a	
Line	3	2 = 6	
Color	2	n/a	
Texture	1	1 = 1	
	Total	7	Total
Vegetation			
Form	4	n/a	
Line	3	2 = 6	
Color	3	2 = 4	
Texture	1	n/a	
	Total	10	Total
Structures			
Form	4	1 = 4	
Line	3	1 = 3	
Color	2	1 = 2	
Texture	1	1 = 1	
	Total	10	Total

Prepared by C. Horman

2a. If Contrast Rating is over maximum for area, redefine Project Proposal, first attempting to lower element of greatest contrast

TABLE 3A-1

LENGTH OF REST (t) IN YEARS
FOR PROPOSED GRAZING SYSTEMS

System/Year	Three-Pasture Deferred	Three-Pasture Alternately Grazed	Four-Pasture Alternately Grazed	Three-Pasture Rest-Rotation ABC	Three-Pasture Rest-Rotation EBC	Two-Pasture Deferred
1	Graze	Graze	Graze	Graze	Graze	Graze
2	0.83	1.54	0.75	0.75	1.00	1.00
3	Graze		Graze	Graze	Graze	Graze
4	1.00		1.54	1.54	0.59	0.62
5	Graze		Graze			Graze
6	0.79		0.75			1.00
7	Graze		Graze			Graze
8	0.63		2.00			0.62
9	Graze					Graze
10	0.63					1.00
11	Graze					Graze
12						0.62

Runoff Methodology

For estimating the impact of the proposed action on runoff "HYMO" was used (Smith 1976). HYMO (hydrologic model) utilizes basin characteristics of area, elevation differences, length, and the Soil Conservation Service's soil-cover complex numbers (CN).

Curve numbers were determined from the calculated infiltration rates by using the following equations (Gifford, Hawkins, and Williams 1975):

Juniper-Grass: CN = 92 - 4.8f - (0.25 + 0.080f) CD
Sagebrush-Grass: CN = 96 - 10.5f - (0.49 - 0.35f) CD
Herbaceous: CN = 92.5 - 5.0f - (0.12 + 0.072f) CD
(with f < 2.13 in/hr)
Rangeland: CN = 92.1 - 4.3f - (0.11 + 0.080f) CD
CN = 92.1 - 4.3f + (0.154 - 0.204f) CD (with f < 2.13 in/hr, CD < 50%)
CN = 113.9 - 14.55f - 0.28 CN (with f > 2.13 in/hr; CD > 50%)
Where CN = Soil-cover complex number.
f = Infiltration rate.
CD = Cover density.

For f, the minimum values were calculated because this would be the value when summer runoff events occur.

Cover density was taken from the range survey data for existing and short term. For long term, the projected percent increase (Chapter 3 vegetation section) was utilized.

The end result was a curve number for ungrazed, light to moderately grazed, and heavily grazed areas for each pasture or allotment for existing conditions, short term, and long term. A weight number for each allotment or pasture was calculated by the allotment acres in the grazing intensity classes. Intensity classes are shown on TABLE 3A-2.

Manning's Equation to Determine Velocity

$$V = \frac{1.49\, R^{2/3}\, S^{1/2}}{n}$$

V = Mean velocity in feet per second.
n = Manning's roughness coefficient.
R = Hydraulic radius in feet.
S = Slope of energy gradient.

APPENDIX 3B

Methods Used in Channel Stability Analysis

Three factors were evaluated in estimating the effects of the proposed action on channel stability: grazing intensity, length of rest, and improvement potential.

Existing data from the Sandy area was used to construct a linear correlation between grazing intensity and channel stability improvement potential (TABLE 2-12).

I = -58.09 + 7.63 CI
R^2 = .72
Where: I = Grazing intensity (APPENDIX 2D).
CI = Channel stability improvement potential.
R^2 = Goodness of fit.

Based on the above relationship, channel stability during grazing was estimated by the following equation, which is analogous to the formula presented by Gifford, Hawkins and Williams (1975) used to predict recovery of infiltration rates (see APPENDIX 3A):

$CSR_G = CSR_O - (CI_E - CI_F)\, T/5$
Where CSR_G = Channel stability at the end of the grazing period.
CSR_O = Existing channel stability rating from inventory data.
CI_E = Existing channel stability improvement.
CI_F = Future channel stability improvement.
T = Time grazed (years).
This assumes five years for full impact of grazing:
$CI_E = 58.09 + 7.63\, I_E$
Where I_E = Existing grazing intensity.
$CI_F = -58.09 + 7.63\, I_F$
T = Time grazed (years).
This assumes five years for full impact of grazing:

$CI_F = 7.61 + 0.13\, I_F$
Where: I_F = Existing grazing intensity.
$CI_F = 7.61 + 0.13\, I_F$
Where I_F = Grazing intensity with proposal (season maximum).

Channel stability at the end of the rest period was estimated by the following equation, which is also analogous to the Gifford, Hawkins and Williams (1975) formula:

$CSR_R = CSR_G - (CSR_O - CI_F)\, T/10$
Where CSR_R = Channel stability at end of the rest.
T = Time rest in years.
This assumes channel stability would fully recover in ten years under rest.

Channel stability ratings were calculated for alternating graze and rest periods. After the first rest period, CSR_R became CSR_O for the next grazing period. The time for grazing and rest periods are shown by grazing systems in TABLE 3B-1.

APPENDIX 3C

Procedures and Methodology Used to Determine Forage Availability for Wildlife Under Proposal

The following procedures and methodology were used to determine various data in TABLES 3-24, 3-27, 3-30, and 3-32 for pronghorn antelope, mule deer, elk, and moose crucial winter habitat, respectively. Columns referred to in this appendix match the numbers in each of the Chapter 3 tables.

Column 1

The acreage of total habitat in this column differs from that cited for allotments in other tables (such as TABLES 2-28 and 2-31) because those allotment tables do not include custodial pastures, Federal withdrawals, and the Palmer no-grazing area which are a part of the total habitat for each key big game species. For example, pronghorn antelope habitat covers 192,005 acres in the Little Sandy-Little Prospect Allotment (TABLE 3-24). Only 185,660

TABLE 3A-2

GRAZING INTENSITY CLASSES

Sandy Intensity Classes	Gifford's Intensity Classes
Marginal and Slight	= Ungrazed
Moderate and Light	= Moderate to Light
Heavy and Severe	= Heavy

TABLE 3B-1

LENGTH OF TIME IN YEARS OF REST AND GRAZE
PORTIONS OF PROPOSED GRAZING SYSTEMS

System Period	Three-Pasture Deferred	Two-Pasture Alternately Grazed	Four-Pasture Alternately Grazed	Three-Pasture Rest-Rotation ABC	Three-Pasture Rest-Rotation EBC	Two-Pasture Deferred
Graze	0.25	0.50	0.50	0.50	0.25	0.25
Rest	0.83	1.50	2.00	0.75	1.00	1.00
Graze	0.25		0.50	0.25	0.25	0.25
Rest	1.00		1.58		0.59	0.62
Graze	0.25		0.50			
Rest	0.79		2.00			
Graze	0.25					
Rest	0.63					
Graze	0.25					
Rest	0.63					

acres (TABLE 2-28) would be under the proposed improved management; the remainder of the total habitat would be 6,345 acres (TABLE 2-29) under custodial management (C-14, 15, 16, 17, 18, 19, 20, 21, and 33).

Antelope habitat usually is more than the allotment totals because antelope use the entire Sandy area. Mule deer, elk, and moose habitat include custodial pastures, Federal withdrawals, and the no-grazing acreages, but the total habitat figures are usually less than the allotment acreages because the entire allotment may not be habitat.

Columns 2 and 3

Crucial winter habitat is that portion of the total habitat needed by the respective big game species for winter survival (TABLES 2-38, 2-42, 2-44, and 2-48).

Column 4

The allotment acreage is used when total habitat acreage is greater since vegetative production figures were computed from allotment acreage. Therefore, when the total habitat acreage is less than the allotment acreage, the acreages of custodial pastures, withdrawals and the no-grazing area were not considered in calculating the total habitat production (allotment acreage of habitat multiplied by allotment production per acre). This was not done because of the time necessary to compute production for wildlife habitat on custodial, withdrawal, and no-grazing areas. This inflates the acres per AUM and deflates production figures on wildlife habitat. This is to the benefit of wildlife because there are more available AUMs on the habitat areas not considered in the production calculations (TABLE 3-15).

Column 5

This is the percent of total habitat that is crucial habitat (Column 3) multiplied by the total habitat production (Column 4).

Columns 6, 7, 8, 9, 10, and 11

The column for the species being considered is omitted. For example, Column 8 is not in TABLE 3-24 for pronghorn antelope since the forage objective in Column 12 would be the AUMs required.

The procedure for determination of competitive AUMs on crucial winter habitat is explained in APPENDIX 21. A supplemental to formula F = E - ABD/C for determination of competitive forage in crucial winter habitat in the A×B/C portion was necessary. Allotment long-term use on TABLE 3-15 is not the same as use on total habitat since habitat acreage is less than allotment acreage in most cases. The use on TABLE 3-15 was reduced to the percent of the allotment that is total habitat and further reduced to more closely correspond to use on actual crucial winter habitat within the allotments. The long-term use by allotment was not used unless the total habitat acreage would be the same as or more than the allotment acreage. The long-term use shown on TABLE 3-15 does not include use on custodial pastures. This means that there would be more use on lands within total habitat than is actually shown.

In the actual procedure, use was taken from TABLE 3-15 and multiplied by the percent of the allotment which is habitat. This value was multiplied by the percent of the total habitat which is crucial winter habitat to determine use on crucial winter habitat. This value is the A×B/C portion of the formula F = E - ABD/C.

Column 12

The long-term objective in AUMs was multiplied by the percent of the total habitat acreage occurring within an allotment and includes custodial pastures, withdrawal lands, and the no-grazing area. The objective was taken directly from TABLE 1-8. Production for the allotments, however, was not determined for the habitat acreage. This value was then multiplied by the estimated percent of the year that a species would be on crucial winter habitat. These figures are: pronghorn antelope 57%, mule deer 54%, elk 50%, and moose 46%. This is based on personal communications with Wyoming Game and Fish Department personnel (January 19, 1977).

Column 13

A 28% reduction was made from crucial winter habitat production (Column 5) based on the Red Desert study by Taylor (1975). He stated that there would be a 28.4% reduction in the carrying capacity of pronghorn habitat in areas with large-scale fencing. Also, Julian (1972) comments that pronghorn would have likely experienced more mortality during the severe winter of 1971-72 if they had encountered fences during migration.

The comparative mule deer mortality in the same spot report (Julian 1972), Lockman's comments that mule deer suffered as much or more during the same storm, and Rock Springs District (BLM) records on mule deer mortality was the basis for concluding that mule deer would also suffer where large scale fencing restricted the accessibility of crucial winter habitat, thus reducing its carrying capacity. The WGFD (1976) considers the 536 miles of proposed fencing in the Sandy area to be a "large-scale" fencing program. Consequently, mule deer crucial winter habitat carrying capacity would also decrease 28%. No deductions from production for the effects of fencing on the carrying capacity of elk and moose crucial winter habitat has been made because of a lack of information; this does not rule out the fact that fencing does limit elk and moose mobility (pers. comm., WGFD 1977 and BLM District Records 1976).

Column 14

Because improved management systems would result in livestock use of undesirable as well as desirable plant species (Hormay 1970), the diet or consumption is altered to incorporate a greater percent of plant species such as shrubs. The greater use of shrubs would decrease forage availability of key species required for survival on crucial winter habitat. An estimated 7.5% competitive increase was applied to Columns 6 and 7 to serve as a "utilization cut" and account for the expected reduced availability of production. Stoddart and Smith (1955) had the following to say about obscure or hard-to-quantify factors involving forage:

Certain factors that characterize a range influence the use that can be made of the forage. On excessively steep slopes, animals cannot or will not fully utilize all the forage. Ranges that are rocky or distant from water are used incompletely. For purposes of conservation, grazing may be reduced below the capacity of the forage, as for example, to protect young timber trees from damage, or to protect erosive soil from excess disturbance. Such reductions are known as utilization cuts. These conditions may be temporary, and some may be overcome by developing water or building trails. Hence, it is not desirable to reduce the forage-acre factor, which should give a true picture of the forage resources. An adjusted forage-acre factor is derived as follows:

Adjusted forage-acre factor = forage-acre factor - (forage-acre factor × utilization cut, per cent). Carrying capacity based on the adjusted forage-acre factor may change with a change in forage production, a development that might change the utilization cut, or a change in use such as a seasonal change or a change in kind of stock.

The intensive grazing systems would change the dietary intake, so the competition for plants necessary for winter survival of key big game species would increase. Based on the available information it is estimated that the competition would increase a conservative average of 7.5% with the change of diet. The Colorado fecal studies upon which diet overlap was based were taken when the animals were eating preferred plant species. Cattle, for example, had not been forced to increase their consumption of shrubs by an improved management system.

Column 15

An average reduction of 18% was made for forage that is covered by winter snow. This reduction is based on snow depth averages taken from 1974-76 meteorological data gathered by the Weather Bureau at Farson and South Pass City collecting stations. When the snow depth is deepest, forage would be most difficult to obtain and mortality most likely to occur. The maximum depth in pronghorn crucial winter habitat would be 5 inches during January. This depth is considered insignificant and no reduction of production was taken on pronghorn crucial winter habitat.

The crucial winter habitat for elk, mule deer, and moose would have an estimated average snow depth of 8 inches. There would be average snow depth of 13 inches between the two weather measurement locations, which are located adjacent to over 95% of all crucial winter habitat in the Sandy area (Farson, 5 inches and South Pass City, 21 inches). It is conservatively estimated that snow cover would average 8 inches in crucial winter habitat areas.

Spot checks of the heights of 100 desired shrubs within crucial winter habitat indicate the average height of desirable shrubs is 15 inches. Observation of desirable shrubs indicates that, on the average, approximately the top 65% (8-1/2 inches) could be used. The average snow depth of 8 inches would cover approximately 1-1/2 inches of the useable average plant height or 18% (1.5 ÷ 8.5 = 0.1765).

Column 16

The procedure for determination of AUMs lost to severe and heavy forage removal was as follows:

A = Acres of severe and heavy use around proposed waters (wells, pits, reservoirs, and springs) from TABLE 3-5.

B = The total number of proposed waters (TABLE 1-13).

C = Average acres of severe and heavy use around proposed waters.

A × B = C

18,154 × 141 = 129

D = Number of proposed waters within crucial winter habitat by allotment (TABLE 3C-1).

E = Acres of severe use around waters within crucial winter habitat by allotment.

F = Acres of crucial winter habitat.

G = Production on crucial winter habitat.

H = Acres per AUM.

I = AUMs lost because of combined severe and heavy use around proposed waters in crucial winter habitat by allotment.

C × D = E

F ÷ G = H

E ÷ H = I

Column 17

A reasonable increase in anticipated occupation and use caused by the proposed waters development would be 7.5% of the competition for forage. For the big game species on crucial winter habitat, this would be as follows:

Pronghorn (TABLE 3-24)—Increased competition from pronghorn (Column 12) and mule deer (Column 9).

Mule Deer (TABLE 3-27)—Increased competition from pronghorn (Column 8), mule deer (Column 12), and elk (Column 10). No increased competition with moose would be expected since the proposed waters are not in moose crucial winter habitat.

Elk (TABLE 3-30)—Increased competition with pronghorn (Column 8), mule deer (Column 9), and elk (Column 12).

Moose (TABLE 3-32)—No competition increases would be expected since no waters are proposed within crucial winter habitat.

An AUM reduction for forage consumed by small animals could not be calculated because of a lack of available information. There would, however, be a reduction in the available forage that can be accounted for thus reducing the production for the key big game species during crucial times. The competitive values and respective forage objectives were added, then multiplied by 7.5% by allotment, and the product placed in Column 17.

Column 18

Columns 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17 were totaled by allotment so the entire AUM debt could be totaled.

TABLE 3C-1

PROPOSED WATERS IN CRITICAL HABITAT AREAS
(EXCLUDING RESERVOIRS ON PERENNIAL STREAMS)

Allotment	Elk	Deer	Pronghorn
Bar X			
Fish Creek			
Gold Creek			
Little Sandy-Little Prospect	9	19	1
Steamboat Mountain	3	4	
Little Colorado:			
Big Sandy Use Area			4 tanks
Farson Use Area			1
Green River Use Area			
Red Desert			
Bush Rim	1		
Continental Peak			
Pacific Creek			1 + 3 tanks
Sands	4	5	3
White Acorn			
Prospect Mountain	2	10	
Reservoir			2
Poston		2	
Pine Creek			

Column 19

Column 18 was subtracted from Column 5 (the production on crucial winter habitat) which would indicate AUM availability. If Column 5 is larger than the AUMs in Column 18, enough AUMs would be available. If Column 5 is smaller than Column 18, there would not be enough available forage, the habitat would deteriorate, and the animals would suffer from lack of food during winter.

Column 20

Crucial winter habitat acreage with adequate forage reservations were added by allotment and totaled, then divided by the total acreage of crucial winter habitat.

Column 21

Crucial winter habitat acreage without an adequate forage reservation were added by allotment and totaled, then divided by the total acreage of crucial winter habitat.

APPENDIX 3D

Analysis of Impacts on Aquatic Wildlife Stream Habitat Conditions

Methods of Analysis

Quantitative or mathematical methodologies (such as the Musgrave, Manning, and Mueggler equations) do not exist which adequately correlate the myriad of variables affecting fisheries habitat. In addition, all of the habitat relationships to biological populations, as well as natural dynamics within populations themselves, make the evaluation and/or estimation of the degree of change associated with a grazing system even more difficult. Thus, several assumptions were made, certain conditions considered in the analysis, and estimations were performed.

Assumptions and Guidelines in Analysis

1. The present physical condition of 16 parameters of the stream channel which were evaluated to determine the channel stability rating. (See FIGURE 3D-1.)
2. The present condition of an additional 17 parameters noted during the stream survey and summarized in FIGURE 3D-2.
3. Existing water quality as it relates to biological productivity, also noted during the stream survey.
4. Existing game fish population estimates based on spot sampling or records of the Wyoming Game and Fish Department (TABLE 3D-1 is an example). The complete table is available upon request from the Rock Springs District Office.
5. Existing levels of use by livestock, as well as projected future levels proposed (TABLE 3D-1).
6. Channel condition improvement potentials estimated on the basis of correcting or improving the existing limiting factors such as ungulate (see glossary) damage through trampling (FIGURE 3D-1).
7. The sequence of events and conditions initiated through livestock grazing, as noted in the simplified and summarized format of FIGURE 3D-3.
8. That under any system or level of grazing, stream bottoms tend to be "grazed out" (pers. comm., Hormay 1976).
9. That the rest provided under a grazing system must compensate for the intensity of use received (pers. comm., Hormay 1976).
10. Extensive field observations of stream habitat conditions under various grazing systems and levels of use within the BLM and U.S. Forest Service, as well as the time required and recovery obtained in control areas protected by exclosure.

Procedure in Analysis

With these elements in mind, each stream surveyed was evaluated by individual reach within the individual pastures of each allotment. This information is available upon request from the BLM Rock Springs District Office. Evaluations of estimated habitat change were then made considering the livestock class and level of use existing at the time of the survey as well as the class and level of use projected for both the short and long term. The vast array of physical conditions presently existing and the potentials for their maintenance or recovery within the periods of rest provided were also considered. Changes in game fish population levels were estimated in terms of ranges (e.g., 200 to 800 per mile) correlated to the anticipated habitat changes, as well as those population ranges presently existing in streams of similar habitat quality and channel stability. Habitat and population changes estimated for the proposed action or alternatives, when compared to stream habitat in the literature (Gunderson 1968, Marcuson 1970 and 1971, Platts 1972, Duff 1976, Tuinstra 1967, etc.), appeared to correlate with findings elsewhere (given the fact that existing conditions may have differed somewhat). In consideration of the miles of stream surveyed, the conditions estimated to be attained would be based on a 90% sample for those stream habitats on national resource lands, or an approximate 60% sample for all stream habitat within the Sandy area.

u36388

FIGURE 3D-1

STREAM CHANNEL STABILITY FIELD EVALUATION FORM*

(Rating for Little Sandy - Station 43 - 44)

Item Rated	Stability Indicators by Classes											
UPPER BANKS	EXCELLENT			GOOD			FAIR			POOR		
Landform Slope	4	Bank slope gradient <30%.	2	Bank slope gradient 30-40%.	(4)	6	Bank slope gradient 40-60%.	6		Bank slope gradient 60%+	8	
Mass Wasting Existing or Potential	6	No evidence of past or potential for future mass wasting into channels.	3	Infrequent and/or very small mostly healed over. Low future potential.	6	(9)	Moderate frequency & size, with some raw spots eroded by water during high flows.	12		Frequent or large, causing sediment nearly yearlong or imminent danger of same.	12	
Debris Jam Potential Floatable Objects	3	Essentially absent from immediate channel area.	2	Present but mostly small twigs and limbs.	(4)	4	Present, volume and size are both increasing.	6		Moderate to heavy amounts, predominantly larger sizes.	8	
Bank Protection from Vegetation	4	90% + plant density. Vigor and variety suggests a deep, dense root mass.	3	70-90% density. Fewer plant species or lower vigor suggests a less dense or deep root mass.	(6)	6	50-70% density. Lower vigor and still fewer species form a somewhat shallow and discontinuous root mass.	9		<50% density plus few species & less vigor indicate poor, discontinuous and shallow root mass.	12	
LOWER BANKS												
Channel Capacity	2	Ample for present plus some increases. Peak flows contained W/D ratio <7.	1	Adequate. Overbank flows rare. Width to Depth (W/D) ratio 8-15.	(2)	3	Barely contains present peaks. Occasional overbank floods. W/D ratio 15-23.	3		Inadequate. Overbank flows common. W/D ratio 25.	4	
Bank Rock Content	8	65%+ with large, angular boulders 12"+ numerous	2	40-65%, mostly small boulders to cobble 6-12".	4	4	20-40%, with most in the 3-6" diameter class.	6		<20% rock fragments of gravel sizes, 1-3" or less.	(6)	
Obstructions Flow Deflectors Sediment Traps	4	Rocks, old logs firmly embedded. Flow pattern of pool & riffles stable without cutting or deposition.	2	Some present, causing erosive cross currents and minor pool filling. Obstructions and deflectors newer and less firm.	4	(6)	Moderately frequent, moderately unstable obstructions & deflectors move with high water causing bank cutting and filling of pools.	8		Frequent obstructions and deflectors cause bank erosion yearlong. Sed. traps full, channel migration occurring.	8	
Cutting	8	Little or none evident. Infrequent raw banks less than 6" high generally.	4	Some, intermittently at outcurves & constrictions. Raw banks may be up to 12"	8	(12)	Significant. Cuts 12-24" high. Root mat overhangs and sloughing evident.	12		Almost continuous cuts some over 24" high. Failure of overhangs frequent.	16	
Deposition	8	Little or no enlargement of channel or point bars.	4	Some new increases in bar formation, mostly from coarse gravels.	8	(12)	Moderate deposition of new gravel & coarse sand on old and some new bars.	12		Extensive deposits of predominately fine particles. Accelerated bar development.	16	
BOTTOM												
Rock Angularity	2	Sharp edges and corners, plane surfaces roughened.	1	Rounded corners & edges, surfaces smooth & flat.	(2)	3	Corners & edges well rounded in two dimensions.	4		Well rounded in all dimensions, surfaces smooth.	6	
Brightness	3	Surfaces dull, darkened, or stained. Gen. not "bright".	1	Mostly dull but may have up to 35% bright surfaces.	2	(3)	Mixture, 30-50% dull and bright, ± 15%; i.e., 35-65%.	4		Predominately bright, 65%+ exposed or scoured surfaces.	6	
Consolidation or Particle Packing	5	Assorted sizes tightly packed and/or overlapping.	2	Moderately packed with some overlapping.	4	(6)	Mostly a loose assortment with no apparent overlap.	8		No packing evident. Loose assortment, easily moved.	8	
Bottom Size Distribution Percent Stable Material	14	No change in sizes evident. Stable materials 80-100%.	4	Distribution shift slight. Stable materials 50-80%.	8	(12)	Moderate change in sizes. Stable materials 20-50%.	12		Marked distribution change. Stable materials 0-20%.	(16)	
Scouring and Deposition	1	Less than 5% of the bottom affected by scouring and deposition.	2	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	(16)	30-50% affected. Deposits & scour at obstructions, constrictions, and bends. Some filling of pools.	24		More than 50% of the bottom in a state of flux or change nearly yearlong.	24	
Clinging Aquatic Vegetation Moss & Algae	3	Abundant. Growth likely moss like, dark green, perennial. In swift water too.	1	Common. Algal forms in low velocity & pool areas. Moss here too and swifter waters.	2	(3)	Present but spotty, mostly in backwater areas. Seasonal blooms make rocks slick.	4		Perennial types scarce or absent. Yellow-green, short term bloom may be present.	4	
IMPROVEMENT POTENTIAL	88	21% COLUMN TOTALS			18			70			24	

Record the values in each column for a total reach score. (E.___+ G. 18 + F. 70 + P. 24 = 112)

Reach score of: 38 = Excellent, 39-76 = Good, 77-114 = Fair, 115+ = Poor.

Circle only one of the numbers in parenthesis for each indicator rated. If condition falls between the conditions described, cross out the given number and write in the intermediate value. The above form is to be completed each time Form 6671-2 is completed (see Part II, Recording Field Data). The above form was developed by Hydrologists in the Northern Region of the United States Forest Service.

*Source: BLM Manual 6671-3, Appendix I.

FIGURE 3D-2

STREAM EVALUATION SHEET*

Little Sandy — Stations: 40-47

Channel Stability Rating - 108-112 (low fair-poor)

Ungulate Damage - 30-60% — Ungulate Stability: All critical Low Fair present status

Average Channel Improvement Poss. - 21%

Miles BLM - 1.75 — Stations: 41.25-43

Spawning Habitat (fisheries) - Poor

Resident Habitat (fisheries) - F-1

Riparian Zone Width (ea. bank) -10-15'

Riparian Vegetation - Willow/Grass bottom

Pool/Riffle Ratio - 97:3

Average Channel Width - 12'

Average Depth - 4-12"

Velocity - .2 - .5 fps

Gradient - .2 - .5%

Sinuosity - 1.6 - 1.7

Bottom Composition - 50-80% silt, 14-40% fine gravel

Riparian Soil Type - Sandy silt loam

Watershed Erosion Status - Actively eroding watershed on east side

Major Problems - Mass wasting, cutting, deposition, bed load movement, cattle

Recommendations - Reduce ungulate damage to less than 10% with protective fencing, improve riparian vegetation to reduce cutting and mass wasting, possibly use in-stream devices (gabions, etc.) to control bedload movement.

*Detailed sheets for Sandy area streams are available for review in the Rock Springs District Office.

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TABLE 3D-1

EXAMPLE OF ANTICIPATED SPAWNING AND RESIDENT HABITAT CONDITION UNDER THE PROPOSED ACTION

SPAWNING AND RESIDENT HABITAT

Pasture No.	NRL Streams by Proposed Allotment And Grazing System	Miles of NRL Stream Inventoried	Estimated Fish Populations Per Mile	Total 1975 Licensed Use in AUMs	1975 Active Use in AUMs	Short-Term Active Use AUMs - Diff.	Long-Term Active Use AUMs - Diff.
	Little Sandy-Little Prospect						
	2-Pasture Alternately Grazed Cattle Sheep Horses			10,236 3,283 17	9,878 3,283 17	8,324 - 16% 2,599 - 21%	11,089 + 12% 3,447 + 5%
	3-Pasture Rest-Rotation Trailing					394	450
1.	Little Sandy River	1.50	200				
2.	Little Sandy River	3.50	0				
4.	Little Sandy River Lander Creek Ord Creek	0.50 0.45 0.50	880 Unk. Unk.				
5.	Ord Creek	2.00	Unk.				
	ALLOTMENT TOTAL	8.45		13,536	13,178	11,317 - 14%	14,986 + 32%

ANTICIPATED SPAWNING HABITAT CONDITION

Pasture No.	NRL Streams by Proposed Allotment And Grazing System	Good (Miles) P*	S*	L*	Fair (Miles) P	S	L	Poor (Miles) P	S	L	None (Miles) P	S	L
	Little Sandy-Little Prospect												
	2-Pasture Alternately Grazed Cattle Sheep Horses												
	3-Pasture Rest-Rotation Trailing												
1.	Little Sandy River							1.50	1.50	1.50			
2.	Little Sandy River							3.50	3.50	3.50			
4.	Little Sandy River Lander Creek Ord Creek				0.50	0.25	0.25		0.25	0.25	0.45 0.50	0.45 0.50	0.45 0.50
5.	Ord Creek							0.75	0.75	0.50	1.25	1.25	1.25
	ALLOTMENT TOTAL				0.50 6%	0.25 3%	0.25 3%	5.75 68%	6.00 71%	5.75 68%	2.20 26%	2.20 26%	2.45 29%

ANTICIPATED RESIDENT HABITAT CONDITION

Pasture No.	NRL Streams by Proposed Allotment And Grazing System	Good (Miles) P	S	L	Fair (Miles) P	S	L	Poor (Miles) P	S	L	None (Miles) P	S	L
	Little Sandy-Little Prospect												
	2-Pasture Alternately Grazed Cattle Sheep Horses												
	3-Pasture Rest-Rotation Trailing												
1.	Little Sandy River			0.25	1.50	1.50	1.00			0.25			
2.	Little Sandy River			0.50	3.50	3.50	2.50			0.50			
4.	Little Sandy River Lander Creek Ord Creek	0.50	0.25		0.45 0.50	0.25 0.25 0.25	0.50 0.15 0.25		0.20 0.25	0.30 0.23			
5.	Ord Creek				2.00	1.50	1.25		0.50	0.75			
	ALLOTMENT TOTAL	0.50 6%	0.25 3%	0.75 9%	7.95 94%	7.25 86%	5.65 67%		0.95 11%	2.05 24%			

* P - Present; S - Short Term, L - Long Term.

APPENDIX 3E

Socioeconomic Analysis

Criteria for Assessment of Significance

Impacts of the proposed action were evaluated using the following criteria.

High Significance Resulting in noticeable lasting change in the social and/or economic condition for most residents of the region; or, resulting in a major change in the social or economic conditions for some identifiable smaller population group.

Medium Significance Resulting in a noticeable, lasting change in the social or economic conditions for some identifiable group of residents.

Low Significance Resulting only in changes in the social or economic condition for any group of residents which are either expected to be barely noticeable or to be not lasting.

Neutral Impact Resulting only in unnoticeable or undetectable changes in the social or economic conditions for any group of residents.

Methods and Calculations

Employment A. To determine estimates of the contribution to employment of ranches using Sandy area resources, the following methods and assumptions were used.

1. Existing licensees were classified as either sheep or cattle operators.
   a. One licensee was excluded since allotment is a horse allotment (small).
   b. One sheep licensee currently not engaged in livestock operations was excluded.
   c. Six sheep licensees were considered cattle operators. All are taking total nonuse on these sheep operations in the Sandy area, but remain in active cattle operations elsewhere in the district.
2. Resulting classification:
   a. 19 sheep operators
   b. 27 cattle operators
3. To the above figures, three man-equivalents per ranch were applied to cattle operations and eight man-equivalents per ranch for sheep operations (Stevens, 1971 and 1975): Total = 233.

B. Determining the contribution of Sandy area resources to regional employment.

1. Existing situation (see TABLE 2-24):
   a. Present sheep AUMs = 117,318.
      Present cattle AUMs = 32,970.
   b. 117,318 sheep AUMs = 117,318 × 5/12 = 48,883 sheep units/year.
   c. 48,883 sheep units divided by 900 sheep/man-equivalent = 54 man-equivalents.
   d. 32,970 cattle AUMs = 2,748 cattle units (c.u.)/year (32,970/12).
   e. 2,748 cattle units × 9.4 man hours/c.u. = 25,831/2,080 (hours per man-year) = approximately 12 man-equivalents.
   f. Combined total = 66 approximate man-equivalents.
2. Future situation *without* project (see TABLE 2-76).
   a. At Year 23
   1. 38,992 sheep units/900 = 43 man-equivalents.
   2. 2,664 cattle units × 9.4/25,042/2,080 = 12 man-equivalents.3. 43 + 12 = 55.
   4. Conclusion: Eleven man-equivalents would be lost without the project.

C. Impacts with the project (see TABLE 3-15):

1. Ranching employment:
   a. At Year 23
   1. 32,550 sheep units/900 = 36 man-equivalents.
   2. 7,369 cattle units × 9.4/2,080 = 33.
   3. 36 + 33 = 69 man-equivalents.
   4. Conclusion: Implementation of the proposed action would create 5 additional man-equivalents.
2. Construction employment generated by construction of project improvements: All construction employment would take place in the short-term period. The maximum number of construction man-days would be required in Year 4 of the proposed action (TABLE 1-14) and would account for only a fraction of 1% of regional construction employment. The necessary construction workers should be readily available from the unemployed in the existing labor force.
3. Other employment generated by the proposal: According to Chapter 1, additional BLM manpower necessary to perform management and administrative functions associated with the proposed action would be five new employees.
4. Secondary employment generated: Additional employment beyond that directly attributable to the proposed action may result (multiplier effect), but it has not been specifically calculated. Employment numbers generated by the project are so small that the increment added by an employment multiplier would still be too small to make the cumulative effect significant.
5. Evaluation of the impacts: The proposed action would result in a maximum increase in regional employment of only a fraction of 1% and therefore is considered insignificant.

Population and Infrastructure Needs In the typical situation, population is a function of changes in the labor force. Since the proposed action would not result in any significant change in employment, there would be no impacts upon population. Similarly, if there are no increases in population due to the action, there would be no increased housing or other infrastructure needs. Because of the relationship between employment, population, and infrastructure, and because there are only insignificant changes in employment anticipated, a detailed analysis of these socioeconomic elements is neither necessary nor justified.

Recreation Expenditures Recreation expenditures are determined by forecasting the yearly visitor days for the various activities and then multiplying these by the appropriate daily values. The result is a recreation value for hunting, fishing, and non-consumptive use. The latter includes activities such as picnicking, camping, and off-road vehicle use. The daily values for these activities are as follows:

a. Antelope: $75.00/day
b. Elk: $147.00/day
c. Deer: $52.00/day
d. Moose: $43.85/day
e. Upland Game Birds: $6.00/day
f. Waterfowl: $6.00/day
g. Fishing: $10.00/day
h. Nonconsumptive use: $6.00/day

These values were obtained from BLM Washington Office Instruction Memorandum 76-455 which describes the procedures for benefit-cost analysis. The moose value was obtained from the Wyoming Game and Fish Department's strategic plan (1975).

APPENDIX 8A

Wildlife Habitat Requirements

The Wyoming Game and Fish Department has established the current status (July 1978) and the habitat requirements and management for the maintenance of wildlife species in the Sandy area. The existing situation for pronghorn antelope, mule deer, elk, moose, sage grouse, and other indicator species is presented below in support of Alternative 7.

Pronghorn Antelope

Status

Antelope occupy all of the Sandy area yearlong, and three major antelope herd units occupy portions of the Sandy area seasonally. The Sublette Herd occupies the northern portion of the Sandy, and Hunt Areas 64, 65, 90, 91, and 96, which occupy all or a portion of the Sandy. The Dry Lake Herd (Hunt Area 92) occupies the southernmost portion of the Sandy. The Red Desert Herd's Hunt Area 60 occupies the easternmost (Divide Basin) portion of the Sandy area. Hunt Areas 91 and 96 of the Sublette Herd are entirely within the Sandy area.

Since the writing of the Draft Sandy ES, more definitive long-term data has been collected on seasonal antelope distribution in the Sandy area. An updated distribution map for antelope in the Sublette and Dry Lake antelope herd units is presented in MAP 8A-1. FIGURE 8A-1 provides an explanation of all symbols used in the maps of this appendix. These data were compiled from past distribution maps, winter range distribution surveys conducted from 1975 through 1978, and yearlong antelope observations (Lockman 1977a and 1978a).

Population objectives (desired population levels) for antelope in the Sandy area are based on herd units. TABLE 8A-1 illustrates the existing population estimates and population objectives for antelope herd units which occupy portions of the Sandy area (Lockman 1978a; Hiatt 1978; Wyoming Game and Fish Department 1978).

The period of occupancy of seasonal antelope ranges has varied over the last eight-year period. In winter, forage availability relative to snow depth and weather conditions triggers movement toward a critical winter range. The duration and intensity of the winter dictates the length of time pronghorns spend on the winter-yearlong and critical winter range.

Past records and more recent population investigations indicate that once every 20 to 25 years this area experiences a very harsh winter such as that in 1971-72. Antelope mortality during such years would be markedly greater than "normal". Once every five to ten years the area experiences a winter of such duration and severity that mortality may exceed what is considered to be "normal" The periodicity of a yearlong drought is unknown; however, a drought similar to that observed in 1976-77 has not occurred since 1934-35. MAP 8A-1 accounts for the effects of the harsh winter of 1971-72 and the mild winter and dry summer of 1976-77 on antelope herd movements and distribution. The map also shows herd distribution in winters preceding the winter of 1971-72 and the winter of 1977-78. The winter of 1977-78 and the winters between 1972 and 1976 were considered relatively mild and more typical of local weather conditions. TABLE 8A-2 shows average dates of pronghorn seasonal range occupancy for herd units within the Sandy area.

Even in "normal"winters, as observed in 1975-76 and 1977-78, crusted and drifted snow conditions to 18 inches in depth precluded the use of intermediate winter range and forced movements to critical winter ranges. In a harsh winter such as that of 1971-72, there would be movement of much of that portion of the Sublette Herd that normally winters north of the Sandy area onto winter range on the south of the Sandy area. Observations and photographs indicate that basin big sagebrush is a very important forage and cover species for antelope in an extremely harsh winter (Julian 1973; per. comm., Long 1976). Continuity of expanses of native, sagebrush-grassland vegetation allows migratory antelope in this area the flexibility through movement to alter their seasonal distribution in harsh winter. Distributions delineated on MAP 8A-1 depict seasonal ranges of this herd over the last ten-year period, but may not reflect the distribution of wintering antelope numbers in a subsequent harsh winter.

Map 8A-1

SUBLETTE AND DRY LAKE ANTELOPE HERD UNIT AREAS INCLUDED IN THE SANDY AREA

FIGURE 8A-1

GUIDELINES FOR MAPPING WILDLIFE DISTRIBUTION

TYPE	DESCRIPTION	SYMBOL
Summer	The general geographic area occupied by a migratory herd during summer months. (Approximately June 1 - October 31)	S
Winter	The general geographic area occupied by a migratory herd during winter months. (Approximately November 1 - May 31)	W
Migration Routes	Definable route followed during seasonal movements year after year. a. General area of movement b. Specific movement corridors	M
Parturition Areas	Geographic area consistently used for birth of young.	P
Breeding Areas	Geographic area consistently used for breeding by the majority of a population.	B
Display Areas	Sites consistently used by the male segment of game bird populations during courtship (e.g., strutting grounds, dancing grounds, drumming sites, etc.) a. censused b. uncounted c. abandoned	
Year-long	Geographic area occupied by all or a portion of the population for the entire year.	Y
Combination	Range where animals occur during more than one season.	S/Y W/Y
Critical	That range that is present in minimum amounts and is the determining factor in the potential for population maintenance and/or growth. This will usually be represented by a winter concentration where most members of a population are forced during periods of maximum snow cover each year or where most members of a population are concentrated during periodic severe winters. The critical range may also be represented by late fall water source or other resources in short supply (e.g., cover for breeding, nesting, fawning, etc.). The degree of criticalness is related to a specific herd and is not related to the density of animals relative to any other herd.	

TABLE 8A-1

EXISTING PRONGHORN POPULATION LEVELS AND POPULATION OBJECTIVES FOR HERD UNITS OCCUPYING PORTIONS OF THE SANDY AREA

Herd Unit	Hunt Areas Comprising Herd Unit	Existing Population Estimate (Post-Hunt, 1977)	Objective (Post-Hunt)	Management Strategy
Sublette	64W, 65W, 85-90, 91, 96	19,000	18,400	Decrease and stabilize
Dry Lake	92	1,000	2,500	Increase and stabilize
Red Desert	60, 61, 64S	Estimate pending further analysis	10,000	Increase and stabilize

TABLE 8A-2

PRONGHORN ANTELOPE SEASONAL USE IN THE SANDY AREA

Seasonal Range	Seasonal Range Designation	Period of Use*
Summer	Summer (S), Winter-Yearlong (W/Y)	April 15 - October 20
Intermediate Winter	Winter-Yearlong (W/Y), Critical Winter and Critical Winter-Yearlong (W/Y)	October 20 - January 15
Critical Winter	Critical Winter and Critical Winter-Yearlong (W/Y)	January 15 - April 15

*Approximate dates based on data collected in 1971-72 and 1975-78.

Numbers of antelope occupying Sandy winter ranges vary with the population size of the Sublette Herd and the severity and duration of the winter. In mild winters there is relatively little movement of antelope from the north. In more "normal"winters there is a movement of antelope from Hunt Areas 87 and 90. In all winters from 1975 through 1978, including the mild winter of 1976-77, there was a movement of antelope from Hunt Areas 64W and 65W onto winter range in the Sandy. Consequently, relative densities of pronghorns occupying Sandy winter ranges vary over time, (Lockman 1976a, 1977a, and 1978a). Assuming a population equal to the population objective for the Sublette Herd, the estimated wintering herd in the Sandy area will range in numbers from 18,400 in an extremely harsh winter to 6,000 in a mild winter, with an estimated 10,000 occupying the Sandy area in a normal winter. The 6,000 number is based on the estimated wintering herd size in Hunt Areas 91 and 96 if the herd was at the level of the population objective (Lockman 1978a). The 10,000 number is based on an estimated ingress of 2,000 antelope from Hunt Areas 64W and 65W and 2,000 antelope from the southern portion of Area 87 and most of Area 90 during the 1977-78 winter (Lockman 1978a).

Habitat Requirements and Management for Maintenance of Pronghorn Herds

According to Sundstrom (1973), "optimum antelope habitat is characterized by the presence of Wyoming big sagebrush" Julian (1973) and Long (per. comm., 1976) emphasized the importance of basin big sagebrush, which is a taller subspecies of big sagebrush, as forage and cover for antelope in harsh winters. Bayless (1968) in Montana and Taylor (1975) in the Red Desert of Wyoming found that sagebrush was selected by pronghorns. Both investigators found that sagebrush consumption was greatest in the winter, with substantial though lesser amounts eaten in other seasons. Cover percentages of Wyoming big sagebrush and other shrub species on antelope winter ranges in the Sandy area should be maintained at or near existing levels. To provide forage and cover for antelope in extremely harsh winters, basin big sagebrush should be maintained where it now occurs.

Vegetation composition on antelope summer and noncritical winter-yearlong ranges should be maintained at 10 to *20% Artemisia* spp., 5 to 15% other browse species, and 25 to 35% forbs (Sundstrom 1973). It is recommended that a shrub composition of at least 30% and forb composition of at least 30% be maintained on antelope spring-summer-fall ranges in the Sandy area. Methods to minimize deterioration of some riparian zones and moist meadow sites by livestock and feral horses would increase the availability of forbs and succulent grasses to antelope in spring and summer. Lockman (1978); Julander *et al.* (1961); Salwasser (1976); Wallmo *et al.* (1977) and Thorne *et al.* (1976) have documented the importance of succulent forbs and grasses in spring and summer to female antelope, deer, and elk that are giving birth and lactating. Proper feed at that time helps maintain herd vigor and productivity.

Antelope population objectives should be altered only after use of big sagebrush and other important winter range shrubs has exceeded 30% in three consecutive years. Taylor (1975) suggests that annual use of big sagebrush over 30% will lower the health and vigor of a stand. BLM should measure utilization annually using an adequate sample size and distribution of production-utilization and vegetation composition transects on antelope winter ranges. This criterion should only be used after measures have been taken to minimize livestock use of shrubs important as winter range for antelope. Seasonal livestock use of shrubs on antelope winter range exceeding 5% in the spring-summer-fall period is excessive and should be curtailed.

Permanent water sources on arid, water-deficient summer ranges would spread out summer antelope distribution. Livestock or wildlife water should not be developed on antelope critical winter habitat. Such water sources allow spring-summer-fall antelope use of shrubs important in the winter. Taylor (1975) emphasized that competitive livestock use of critical winter range should be discouraged. Winter sheep use of antelope winter range is not desirable; however, moderate summer use by cattle does not lower the carrying capacity of antelope winter range. To accommodate antelope, permanent water sources should be spaced not more than 3 to 5 miles apart, and should be available to antelope in summer and fall when livestock are not utilizing the range or water source.

Fichter (1974) and Autenrieth and Fichter (1975) in Idaho; Pyrah (1974) in Montana; and Ingold (1969) in Wyoming have documented the importance of big sagebrush on fawning sites used by female antelope. These investigators disagree about selection of traditional fawning areas by females. Although data on doe antelope distributions immediately prior to parturition (see Glossary) in the Sandy area are not conclusive, specific fawning areas are not discernible. Spring habitat conditions which govern the movements and distribution of females determine the location of fawning. Antelope fawning activities in the Sandy area occur throughout winter-yearlong and summer range and may be governed to a large degree by occurrence of succulent spring forage close to dense sagebrush cover. Studies to date have not provided any quantitative vegetational parameters for fawning sites which would be useful in the development of antelope habitat management objectives. Autenrieth (1976) found that fawns selected greater than average brush canopy coverage, total coverage, and brush height. Existing shrub composition of the summer range in the Sandy area should be maintained until more definitive data on antelope fawning habitat are obtained.

Fencing has long been a problem associated with the management of antelope and antelope habitat. The development of guidelines for fencing on pronghorn ranges has repeatedly demonstrated that there are no universal guidelines which can be applied in every situation. In many areas of eastern Wyoming, pronghorns do not move extensively in response to winter weather in most years. Consequently, fencing which would accommodate spring-summer-fall antelope movements may be tolerable.

However, antelope in southern and southwestern Wyoming migrate between summer and winter ranges in most years. Taylor (1975) stressed the importance of fencing considerations in the Red Desert in the development of livestock grazing systems. Oakley and Riddle (1972) and Oakley (1973) documented direct mortalities associated with grazing system fences during a harsh winter in the Red Desert. These investigators also discussed the alteration of movements and winter antelope distribution due to fences. The Sandy area to date is relatively unfenced, but there has been an increase in highway right-of-way fences in recent years. Bureau of Reclamation lands and private lands within the Eden-Farson Irrigation Project are fenced with sheep-tight barbed wire and net wire fences. Some private lands along the Sweetwater River east of Highway 28 are fenced. The White Acorn Allotment along the Sweetwater River is fenced with three-strand barbed wire designed to better accommodate antelope movements. Net wire and four- to five-strand barbed wire fencing is used on private lands and around an individual use pasture in the Prospect-Lander Creek, Arambel, and Spicer Ranch areas on antelope summer range. The following is a summary of the fence problems which have been observed in the Sandy area in the past three years:

1. Eden-Farson Irrigation Project, five-strand barbed wire fence with bottom wire 2 to 4 inches above ground level on Bureau of Reclamation lands bordering the irrigation project: Antelope have become trapped in various areas within the project. These animals feed yearlong in overgrazed sagebrush-grassland and salt desert shrub habitat types and do not have access to forbs or irrigated croplands. The debilitating effects of pronghorn residing yearlong on these overused sagebrush-grassland ranges were documented by Lockman (1977a). During the last two springs we have dropped sections of fence and opened gates in some of these areas to induce movements out of the project. In the dry spring of 1977, efforts to move antelope out of some portions of the project were unsuccessful. However, in the wet spring of 1978, when succulent forbs were available outside the fence, the Game and Fish Department had some success in moving antelope. In one case antelope moving from winter to summer range got through a section of broken-down project boundary fence and drifted into a five-strand fence corner at the opposite end of the sagebrush-grass pasture. They remained in a corner until the fence was dropped, then most of the antelope moved onto open range. Attempts at driving this group of antelope through the let-down fence failed, but they found the hole and escaped a day after driving attempts had failed. Some antelope that frequent the irrigation project have developed the ability to jump. Jumping fences appears to be done most often by bucks, less frequently by does, and almost never by fawns. When alarmed or pursued, very few antelope will jump a fence. Some will run into the fence, but most run parallel to the fence.

2. White Acorn Allotment fence on the south side of the Sweetwater River and west of Highway 28: This is a three-strand barbed wire fence with 16 to 18-inch bottom clearance. This fence has been in use since 1972. Antelope moving from Area 65 toward winter ranges in the Farson Area cross the Sweetwater River immediately west of Highway 28. A cattleguard lies in the fence corner about 1 mile west of Highway 28. Antelope in November of 1975, 1976, and 1977 began accumulating along this fence. Gates along the fenceline were opened and the antelope moved toward the winter range. Gates were left open in 1975 and 1977 to accommodate antelope return movement in the spring. In the spring of 1977, antelope did not cross the fence and move back across the Sweetwater River until gates were left open. In the spring of 1978, the fenceline was walked and it was observed that antelope moving back to Area 65 crossed the fenceline by going through open gates. No jumping of the cattleguard was noted, nor was there movement under the fence.

3. Highway 187 right-of-way fence north and south of Farson: This is a net wire sheep-tight fence. The right-of-way fence has precluded free movement south of Farson between antelope critical winter habitat segments east and west of the highway. In the spring in some years antelope are trapped in the highway right-of-way. Antelope seeking newly emerging green grass and forbs are attracted to green forage along the highway through open gates, holes under fences and in a few instances, over fences. Vehicle traffic coupled with the net-wire fences panic the antelope. In such cases, constant patrolling is necessary, and much time is spent chasing antelope back to open range. Antelope highway mortality increases as a result. Two sets of opposing let-down panels were constructed in 1977 by the Wyoming Highway Department at Mileposts 20 and 24 to better accommodate antelope movements and help alleviate entrapment problems.

The right-of-way fence has also precluded movements north of Farson between summer and winter ranges east and west of the highway and has restricted the mobility of antelope during north-south migrations in the spring and early winter period. Let-down panels were installed at intervals on opposing sides of the highway fence between the north end of the irrigation project and the Big Piney cutoff road. When winter storms and snow accumulation force a movement of antelope from ranges north and east of the highway to more southerly ranges, the panels are dropped. In the last three winters the panels were dropped only once, in late January 1978, to accommodate an antelope movement. A dye-marking study to monitor antelope movements in the winter of 1973-74 indicated that antelope utilized the drop panels in their movement to winter habitat. In the spring, however, when forage conditions and inclement weather did not force movement, many of the same marked animals followed the fenceline north. When they reached lay-down panels, they continued moving and ended up north in another management area (Julian 1974).

4. Highway 28: These are three- and four-strand barbed wire fences with 16-18 inch ground clearance. Antelope movements from intermediate winter habitat north and east of Farson to critical winter habitat did not occur until February 10-18, 1978. During this mass movement of antelope along both sides of Highway 28,

drifting, crusted snow conditions prevented use of forage on intermediate winter habitat. Tracks of large numbers of antelope moving parallel to the highway fence were observed between Milepost 18 and the fenced boundary of the irrigation project. A large concentration of antelope (an estimated 1,500 to 2,000) was found at the east edge of the project and north of Highway 28. The gates at the bridge of Milepost 6 were opened to allow the antelope to drift across the highway to the south within the fenced project boundaries. In the spring, some antelope crossed back through this opening and an estimated 700 to 1,000 antelope went east through open gates to open range in the Pacific Creek area. About 600 began drifting northeast up the fenceline on the south side of the highway. These antelope were stopped by a fence corner and could not be driven across the highway to the area from which they had originally come. The fence on both sides of the highway was let down to allow these antelope south of Highway 28 to move north; but to little avail. As a result of the new fence on the south side of Highway 28, winter distribution and subsequent summer distribution of these antelope will be markedly altered.

In summary, the antelope on these ranges are migratory. Higher elevations and areas with adequate water and available succulent spring-summer forbs are utilized as spring-summer-fall ranges by antelope. It is essential that antelope in these areas be able to move freely to lower winter ranges. Heavy snow accumulations and crusted, drifting snow, which are common to southwestern Wyoming, can make a seemingly passable fence impassable to antelope. Modification of pronghorn behavior to minimize the effect of fences is unfeasible. The unpublished *Guidelines for the Management of Pronghorn* Antelope (1978) notes, "It cannot be assumed that pronghorns will adapt to changes in habitat resulting from livestock use or that they will learn behavior patterns that will permit them to thrive where their physical environment has been altered by fences" The pronghorn in the Sandy area are in much demand as a resource and should be given consideration in all land management systems. Alteration of distribution on winter and summer ranges in the Sandy area may be a more important result of fences on these antelope ranges than the direct mortality related to fences.

The following recommendations are made for antelope range in the Sandy area:

1. Guidelines for livestock grazing systems and guidelines for fencing in the 1978 *Guidelines for the Management of* Pronghorn *Antelope* should be utilized.

2. Fencing to accommodate only livestock grazing systems should not occur. A minimum amount of fencing should be constructed on these antelope ranges. Alternative grazing systems with minimum fencing which accommodate pronghorn and other wildlife should be employed. Wildlife in the Sandy area should be recognized as a high priority resource and land management systems should provide for wildlife habitat needs.

3. The effect of large-scale fencing such as that proposed in the ES, on migratory antelope populations is poorly understood. However, as previous examples have illustrated, the effect is likely to be detrimental. Consequently, any grazing system utilizing fencing should not be established on the scale of that proposed by BLM or by the operators for the Sandy. The cumulative effects of fencing (range, private, highway, and industrial), coupled with mineral and oil and gas activities and cultural and industrial developments, would severely disrupt the continuity of wildlife habitat and may decrease wildlife diversity if land management systems do not recognize wildlife as a resource of high priority. The result would be decreased wildlife diversity, increased wildlife habitat degradation, and decreased carrying capacity for wildlife.

Pronghorn antelope in the Sandy area should be granted a forage allocation in the Sandy area based on:

a. An animal unit equivalent for antelope of 0.106, or 9.4 antelope per AUM (Taylor 1975).

b. As there are variations in antelope density on seasonal ranges in the Sublette, Dry Lake, and Red Desert Units between years, antelope densities based on the population objective for each herd unit over each seasonal range in the herd unit must be calculated (see TABLES 8A-1 and 8A-2). A forage allocation for antelope in the Sandy area must be based on the calculated density for each seasonal range type in each of the antelope herd units occupying the Sandy area. Summer range densities for the portion of the Sandy area in Hunt Areas 91 and 96 can be calculated from the estimated wintering herd size if the herd was at the level of the population objective (Lockman 1978a).

c. Period of seasonal range use from TABLE 8A-2.

d. Period of competitive forage use and percent diet overlap, utilizing at least five consecutive years of seasonal fecal analysis data, or data of comparable quality, to determine variation in diet overlap over time.

e. Livestock use of critical winter range should be minimized or excluded during periods of snow cover or poor grass and forb production between spring and fall.

f. Livestock or wildlife water should not be developed on critical antelope winter ranges.

g. Winter sheep use of antelope winter range is not desirable. However, moderate summer use by cattle does not reduce the carrying capacity of antelope winter range (Taylor 1975). Existing water sources on antelope winter habitat should be shut off and antelope excluded in the spring and early summer, then cattle can be allowed on the range and waters turned on in midsummer. Should such an arrangement cause a summer movement of antelope back to the winter range, then the water should be shut off.

Mule Deer

Status

The Sandy area includes portions of the Steamboat and Prospect Mountain mule deer herds. The Steamboat Herd consists of Hunt Area 131 and the Prospect Mountain Herd consists of Hunt Areas 130 and 93.

The desired post-hunt population level for the Prospect Herd is 6,000 deer. Recent evidence indicates that the boundaries of this herd are not adequately defined. However, redefinition of the geographical limits of this herd will require collection of long-term movement data. Data from the last three winters indicate that a significant portion of the deer wintering in the Prospect herd come from Hunt Area 138, north of the Big Sandy River. Many of the deer from area 138 winter in the East Fork area. Redefinition of herd unit boundaries awaits a determination of the geographical separation of winter migrations in Area 138. Present populations of wintering Prospect deer in the Sandy area are at or near population objectives. There is very little interchange of deer between the Prospect and Steamboat herds.

The desired post-hunt population level for the Steamboat Herd is 2,500 mule deer. The 1977 post-hunt population estimate for this herd indicated that the population objective would be attained post-hunt 1978. Population data presented here were obtained from Lockman's 1976, 1977, 1978 herd unit completion reports and the 1978 herd unit status report (Wyoming Game and Fish Department 1978a).

MAPS 8A-2 and 8A-3 illustrate the current seasonal distribution of mule deer in the Steamboat and Prospect herds, respectively. More data on winter range use is necessary to more adequately delineate intermediate and critical winter ranges in these herds.

Until more specific seasonal range use data are collected, approximate lengths of seasonal range use for these herds are used (TABLE 8A-3). Fawning ranges have not been defined in most areas of these herds. It appears that mule deer on these ranges may not use historic parturition (see Glossary) areas, and that fawning is widespread throughout the summer range. The Steamboat Herd may have specific parturition areas due to the juxtaposition of forage, cover and water only on certain portions of the summer range. Preferred fawning areas are widely available to deer on the summer range of the Prospect Herd.

Habitat Requirements and Management for Maintenance

Mule deer utilize primarily shrub forage in the fall and winter (Kufeld 1973). Anderson and Wilbert (1958) and Blair (1967) found that deer in the Kemmerer-Cokeville area relied largely on *Artemisia tridentata* and *Artemisia nova* forage from mid-winter through late winter. These investigators also noted the importance of taller growth forms of big sagebrush (apparently, basin and mountain big sage) as insular cover and as forage in periods of low forage availability. On winter ranges of the Prospect antelope, bitterbrush and big sagebrush are dominant on upper elevation wintering sites, while Wyoming big sage, basin big sage, black sage, and willow are dominant shrubs on lower, more critical winter range for deer. In the late winter of 1977-78, Lockman (1978b and c) observed extensive utilization by deer of black sage and Wyoming big sage in the Little Sandy-Squaw Teat wintering area. The Steamboat Herd winters on basin big sage-bitterbrush, basin big sage-bitterbrush-serviceberry, basin big sage-lower sagebrush growth forms, and juniper-big sage-bitterbrush shrub associations. Kufeld (1973) summarized the reports of several investigators who documented the importance of forbs to mule deer on spring-summer range.

Both herds prefer southern and western exposures and wind-sheltered basins for feeding and resting (Lockman 1977b and c, 1978b and c). Existing shrub densities in the Sandy area should be maintained to maintain mule deer populations. Livestock use of shrubs important as forage and cover for deer in winter should be minimized. Livestock should not be allowed to use deer critical winter range in periods when livestock forage is unavailable or in short supply. Where spring through fall livestock use of shrubs on deer winter range exceeds 10% of the current year's growth, livestock should be removed from the deer winter range. This should be monitored annually.

Low water availability appears to limit mule deer summer distribution on some portions of the Steamboat range. Additional water developments for livestock and wildlife will better distribute mule deer in summer and lessen the detrimental affects of livestock use of mule deer winter habitat.

Vegetation associated with seral aspen communities is important to mule deer from spring through fall. Seral aspen communities, riparian habitat, and wet meadow sites provide forb and grass forage essential to the female late in gestation and in lactation (Schneegas, *et al.* 1977). Range management objectives for the Sandy area should include forage requirements of mule deer. Forb composition on mule deer summer ranges should be at least 20% of the plant composition. On noncritical winter-yearlong and summer ranges, cattle use should be deferred or minimized in the period of forb growth, especially between Prospect Mountain and the lower Wind River Mountains. All deteriorated riparian habitats and riparian habitats with a downward trend in shrub cover should be protected from over-use and accelerated deterioration by livestock. Measures should be implemented to improve deteriorated riparian habitat in the upper Big Sandy and Little Sandy drainages upstream from the irrigation project. On aspen and aspen-conifer habitats which are advanced successionally, long-term habitat improvement should be implemented livestock use minimized on each improvement site for one year following reclamation measure. All wildlife habitat with potential for improvement should be delineated and a long-term wildlife habitat improvement program implemented.

Fences have been shown to cause mortality to mule deer throughout Wyoming, especially those fences which occur on winter ranges or intercept migration routes. Fences causing the least mortality to mule deer appear to be pole and log fences and barbed wire fences with a maximum height of 38 inches and a minimum of 12 inches between the top two wires. Well-maintained, tight fences are less detrimental than poorly maintained, loose fences. Any new fencing employed on mule deer range should comply with BLM fencing policy for mule deer and antelope ranges.

Mule deer in the Sandy area should be granted a forage allocation based on:


R.103 W.
T.24N.
T.23N.
T.22N.
T.21N.
R.108 W.
R.103 W.
Forest
Rock Springs
I-80
OUT
W/Y
S
Map 8A-2
Mule Deer - Steamboat

Map 8A-3

Mule Deer – Prospect Mountain

a. An animal unit equivalent for mule deer of 0.20, or 5.0 deer per AUM (Stoddart and Smith 1955).

b. Because of variations in mule deer density (mule deer per unit area) on seasonal ranges in the Steamboat and Prospect Units between years, mule deer forage allocations should be based on population objectives for each herd and each seasonal range in the herd unit. A forage allocation for mule deer in the Sandy area must be based on the calculated deer density for each seasonal range type in each of the mule deer herd units.

c. Competitive seasonal forage use and percent diet overlap (utilize long-term data—five consecutive years of seasonal fecal analysis or data of comparable quality—to determine variation in diet overlap over time).

d. Seasonal range use from TABLE 8A-3.

e. Use of deer critical winter range by cattle and other livestock should be minimized or excluded during periods of snow cover or poor grass and forb production from spring through fall.

f. Winter sheep use of mule deer winter range is not desirable, but moderate summer use by cattle is not detrimental to the carrying capacity of the mule deer winter range.

Elk

Status

Elk occupy portions of the Sandy area yearlong, and the Prospect Mountain and Steamboat elk herds occur seasonally on a large portion of the Sandy. The Steamboat elk herd is unique in that it is one of the only desert elk herds in North America. The Prospect Mountain Herd Unit consists of Hunt Areas 99 and 27 West. Hunt Areas 100, 101, and 109 constitute the Steamboat Herd unit. Since the Preliminary Draft Sandy ES was written, long-term data have been collected on seasonal elk distribution for these units (MAPS 8A-4 and 8A-5). Information for the winters of 1975-76, 1976-77, and 1977-78 indicates that forage availability between winters in the Prospect Unit dictates the choice of critical winter range, the portion of the critical winter range used, and the degree of movement of Prospect elk onto critical winter ranges in the Steamboat elk herd.

Population objectives for elk herds occupying the Sandy area are based on herd units (TABLE 8A-4, Lockman 1978d and e, and WGFD 1978). An evaluation of available information on elk movements indicates an interchange of elk between the Prospect and Steamboat Herds. More definitive data on the degree of interchange are necessary before herd unit redefinition. Elk population objectives would not be changed unless changes in carrying capacity of critical winter range justify such action and there has been implementation of methods to minimize livestock use of forage on important elk winter range.

The period of occupancy of elk seasonal ranges has varied over the last six years. The duration and intensity of winter dictates the length of time elk spend on the winter, winter-yearlong, and critical winter range (TABLE 8A-5). Continuity of unaltered native vegetation and physical features allow elk in these areas the flexibility to move seasonally. Distributions delineated on MAPS 8A-4 and 8A-5 include known variations in seasonal habitat use by these elk between 1970 and 1978. Numbers of elk occupying specific winter habitat areas vary with population size and the severity and duration of winter weather.

Habitat Requirements and Management for Maintenance

The following habitat requirements are necessary for the maintenance of desired elk population levels in the Sandy area:

Winter Range Habitat Requirements. Elk utilizing winter ranges north of Highway 28 require windswept ridges and southern exposures for feeding, such as the divide along the southeast end of the Prospects, southerly-running ridges in the Monument Draw area, and the breaks along the north side of the Sweetwater River. Bedding cover on open southerly exposures and in drainages with stands of basin and mountain big sagebrush is used in cold, windy periods. Along the Sweetwater breaks, elk utilize stands of conifers on northern exposures and river bottom willows for bedding. When forage is unavailable on important feeding sites, elk move into the Little Sandy River-Upper Dry Sandy area and onto critical winter ranges in the Steamboat Unit. During "normal"snowfall years some of the elk, and in some years most of the elk, on critical winter range in the Propsect Herd move south onto critical winter ranges in the northern and eastern portions of the Steamboat Herd. In the winter of 1975-76, 150 to 250 elk moved south in mid-February and returned north of Highway 28 in early to mid-April. No elk moved south during the mild winter of 1976-77. However, in early June of that year single and small groups of adult bulls were observed moving up the Sweetwater Divide toward the mountains by WGFD personnel and a few local people. In the winter of 1977-78, 350 to 450 elk moved south in late January and early February and returned north across Highway 28 in mid-March to late March. Elk wintering near the confluence of the East Fork of the Sweetwater and the Sweetwater River (about 70 head) in 1977-78 had not left this area by late February and apparently remained in the area the entire winter. In the winter of 1971-72, almost all of the elk from the Prospect Herd moved south onto Steamboat Herd winter ranges, except for 50 head which moved onto the Little Sandy River between the Spicer Ranch and Squaw Teat (per. comm., Long 1976). There were winters in the 1960's when some Steamboat elk moved into the Eden-Farson agricultural project to winter and caused depredation problems on local haystacks. An evaluation of winter elk movements in the Prospect Herd since 1971-72 indicates that in severe winters some of those elk move into the Steamboat Herd unit and some move onto the Squaw Teat-Little Sandy-Upper Dry Sandy critical winter range. In the Squaw Teat-Little Sandy-Upper Dry Sandy area, winter elk use may be in

TABLE 8A-3

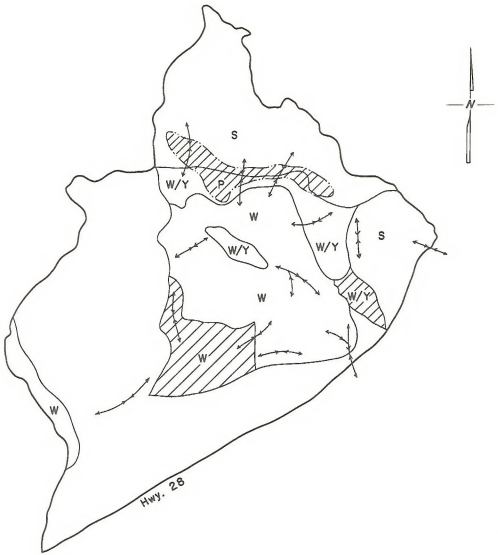
APPROXIMATE SEASONAL RANGE USE BY MULE DEER IN THE SANDY AREA

Seasonal Range	Seasonal Range Designation	Period of Use
Prospect Unit		
Winter	Winter, Winter-Yearlong, Critical Winter and Winter-Yearlong	Nov. 1 to May 1
Summer	Winter-Yearlong, Critical Winter-Yearlong, Summer	May 1 to Nov. 1
Steamboat Unit		
Winter	Winter-Yearlong, Critical Winter-Yearlong	Nov. 1 to May 1
Summer	Summer, Critical Summer, Winter-Yearlong, Critical Winter-Yearlong	May 1 to Nov. 1

TABLE 8A-4

EXISTING POPULATIONS AND POPULATION OBJECTIVES FOR ELK IN HERD UNITS OCCUPYING PORTIONS OF THE SANDY AREA

Herd Unit	Hunt Areas Comprising Herd Unit	Existing Population Estimate (Post-Hunt, 1977)	Objective (Post-Hunt)	Management Strategy
Prospect Mountain	99, 27 W.	500-750	1,000	Stabilize
Steamboat	100, 101, 109	500	500	Stabilize



Map 8A-4

ELK - PROSPECT
99, 27W

Map 8A-5

EIA - Streamboat

TABLE SA-5

ELK SEASONAL USE IN THE SANDY AREA

Seasonal Range	Seasonal Range Designation	Period of Use[1/]
Prospect Mountain		
Summer[2/]	Summer (S) Winter-Yearlong (W/Y)	May 1 to May 15 June 20 to Nov. 15
Parturition[3/]	Parturition (P) Summer (S) Winter-Yearlong (W/Y) In parturition period	May 15 to June 20 May 15 to June 20
Intermediate Winter[3/]	Winter-Yearlong (W/Y) Critical Winter (C/W) Critical Winter Yearlong (CW/Y)	Nov. 15 to Jan. 1
Critical Winter[4/]	Critical Winter (C/W) Critical Winter-Yearlong (CW/Y)	Jan. 1 to May 1
Steamboat		
Summer	Summer (S) Winter-Yearlong (W/Y) Critical Winter-Yearlong (CW/Y)	June 20 to Nov. 1
Parturition	Parturition (P)	May 1 to June 20
Intermediate Winter	Winter-Yearlong (W/Y) Critical Winter-Yearlong (CW/Y)	Nov. 1 to Jan. 1
Winter	Critical Winter-Yearlong (CW/Y)	Jan. 1 to May 1

1/ Approximate dates based on WFD data collected between 1971 and 1978.

2/ At least 80% of the summer elk use occurs on the national forest.

3/ In the parturition or calving period, this range receives the heaviest elk use. Most bulls and some non-pregnant females occupy adjacent summer and winter-yearlong range in this period, some pregnant females calve in ranges other than parturition ranges.

4/ In "normal" snowfall years some elk, and in some years most of the elk on critical winter range in the Prospect Unit move south when forage becomes unavailable (by late January or early February), onto critical winter ranges in the northern and eastern portions of the Steamboat herd unit. In the winter 1975-1976, 150 to 250 elk moved south in mid-February and returned north of Highway 28 in mid-April. In the mild winter of 1976-1977, no elk moved south. In the winter of 1977-1978, 350 to 450 elk moved south in late January and early February and returned north of Highway 28 in mid-to late March).

direct competition with mule deer. In most winters a small number of elk will winter on ridges in the Sweetwater Breaks. It appears that insular cover is limiting and that the relative lack of insular cover on ridges southeast of Big Prospect Mountain preclude use of these areas in late winter. Thus, a lack of vegetative and physical cover combined with drifting, crusted snow conditions which make forage unavailable, forces a movement of Prospect elk onto winter ranges in the Steamboat Herd unit and the Little Sandy area, which offer available forage and insular cover. The insular cover and shrub forage availability is sufficient for the small number of wintering elk along the Sweetwater River in most years.

Wyoming big sagebrush, basin big sagebrush, black sagebrush and willow are the plants on the Squaw Teat-Little Sandy winter range most available to elk and mule deer. Along the Little Sandy River, elk prefer to bed in willow and basin sagebrush cover. Forage preference by elk in the Squaw Teat area in winter is unknown but is assumed to be mainly shrubs, as grasses are mostly unavailable (Lockman 1977d and 1978d; WGFD 1978a).

In the Steamboat Herd, elk move south and east from the Aspen-Pacific Butte, Alkali Wash and upper Rock Cabin Creek areas onto critical winter habitat in Parnell Creek Basin, north of Jack Morrow Creek, on lower Rock Cabin Creek, and in the Alkali Creek area between Freighter Gap and Bar X Ranch. Elk on these critical winter ranges feed on grasses exposed on wind swept ridges, steep south slopes and in sheltered drainage basins (e.g., Parnell Creek) where forage is available. Elk on these ranges prefer to bed in draws, sheltered bottoms, and southern exposures in dense stands of basin big sagebrush and/or other shrubs. The prevailing winds in the Prospect and Steamboat Units are from the west so eastern exposures (leeward) are generally drifted with deep snow and unavailable to elk in most winters. Elk from the Prospect Herd which winter in the Steamboat area utilize ranges between Rock Cabin Creek and the Bar X Ranch in close association with Steamboat elk.

Elk in the Steamboat Rim, Essex, Loco Butte and the Sands area winter from the western slope of Loco Butte and Essex Mountain to Buffalo Hump and between Loco Butte and Steamboat Rim in the sand dune area. Winter elk use of Steamboat Rim has decreased during the last five years. Records prior to the past three years indicate that elk spent the entire winter on ridges along Steamboat Rim. Increased horse numbers and intensive cattle use on the north side of the Rim has decreased forage for elk in winter. In the last three winters, most of the elk moved off the Rim through Johnson Gap and Indian Gap by early February and into the Steamboat Mountain-Freighter Gap-Black Rock area to the east and the Essex Mountain-Loco Butte area to the west. On these winter ranges elk utilize stands of basin big sagebrush as cover for bedding. Grasses on wind-blown ridges, southern and western exposures and in basins are used as forage. Coop (1971), Black (1976), Beall (1970), and Allen (1976) have documented the importance of insular cover and available forage on elk winter range. The greatest habitat similarities between Steamboat (desert) and Prospect elk are displayed on the winter range.

Summer Range Habitat Requirements. In March and April, Prospect elk follow the receding snowline from shrub-grass winter ranges onto aspen-sagebrush-conifer ranges at the base of the Wind River Mountains. These elk utilize aspen-sagebrush plant associations close to water for calving. After calving, elk disperse throughout the summer habitat as the snowline recedes. The general movement is up. On summer range, elk prefer heavy coniferous cover for bedding and small wet meadows for feeding (Black *et al.* 1976; WGFD 1978a). By early September, high mountain meadow forage is curing and elk seek feed on drier shrub-grass sites adjacent to aspen or conifer cover. Elk in the Steamboat Herd have similar preferences but have substituted basin big sage, less aspen, and topographical relief for the conifer and aspen cover utilized by mountain elk from spring through fall. Steamboat elk utilize stands of basin big sagebrush and aspen close to water for calving and select sites which are relatively undisturbed by man. Roberts (1974) and Phillips (1966) are two of many investigators who have documented the importance of calving cover to elk.

The following is a general description of elk calving areas and requirements for the Prospect and Steamboat elk herds from unpublished field notes (Lockman 1976 and 1977).

Prospect Mountain Calving Area.

1. Area of gradual slope, often along drainages or near seeps and springs.
2. Irregular edge of aspen adjacent to shrub cover.
3. Juxtaposition of aspen or willow on moist sites with sagebrush on dry to moist sites.
4. Water and succulent forb-grass forage close to cover, usually within 50 meters.
5. Aspen stand with boulders, fallen logs and/or scattered shrubs in the understory as disruptive cover for calf concealment; sometimes in close proximity to mixed aspen-conifer stands.

Steamboat Unit Calving Area.

1. Area of gradual slope, often slopes of draws or basins and often in the bottom of a drainage.
2. Close to water and succulent forage when possible, but farther than 200 meters where cover is sparse.
3. Dense, irregular shaped stands of basin big sagebrush or aspen with adjacent low growth forms of sagebrush and/or other shrubs.
4. Sagebrush and aspen stands often with much log and branch litter in the understory as disruptive cover, or sometimes with an understory of lower growth forms of shrubs.

Steamboat elk rely greatly on the basin big sagebrush in summer and winter for its cover value. Criteria for optimum water distribution on desert elk summer habitat have not been established. However, in the summer, elk are generally found near permanent, good quality water sources. Rough, broken topography and stands of basin big sagebrush on sandy soils and in drainage bottoms provide escape cover and concealment. Systematic observations of cattle and elk on elk summer range in Montana indicated a significant tendency for elk to avoid

cattle (Allen 1976). Observations by Lockman (1977e and 1978e) in the LaBarge Creek area indicate the same reaction by elk to sheep and cattle occurs to some degree on that summer range. However, those elk usually had a suitable escape area. Elk in the Steamboat Herd are often observed feeding with or near a band of feral horses. They are seldom observed feeding near cattle or sheep. In recent years the greatest summer concentration of Steamboat elk has been seen in the livestock nonuse area from Oregon and Pacific Buttes to lower Rock Cabin Creek. The increased numbers of desert elk in recent years are related to availability of water and spring-summer grasses and forbs on the livestock nonuse area. This nonuse also provides an ample supply of winter elk forage. As a result, this area has been very important to wintering Steamboat and Prospect Mountain elk. Feral horses in this area also utilize the grass-forb forage. The widespread distribution of habitat, habitat features, habitat continuity, and the nonuse livestock area have played an important role in yearlong maintenance of the Steamboat elk herd in the face of increased human activity on its range.

The influence of fences on elk distribution and behavior is poorly understood. Numerous accounts of fence-related mortality of elk in Wyoming have been recorded. Poled-top, 38-inch high fences have been constructed to minimize fence entanglement by deer and elk at traditional elk crossings on some Wyoming Game and Fish Department-managed elk winter habitat. However, elk mortality from fence entanglement undoubtedly occurs less often than that of deer and antelope.

Elk consume available grasses and some shrubs in winter (Mackie 1970; Boyd 1970). Olsen and Hanson (1977) determined the grasses important to elk wintering on portions of the Steamboat range in one year. Grasses are available most years (on sites previously described) on the Steamboat elk winter range if summer livestock use has not decreased the forage for elk. Ward (1971) indicated that the importance of sagebrush as forage for wintering elk in southern Wyoming may be understressed and that knowledge of sagebrush importance to elk in winter is lacking. There are winters when deep or crusted snow precludes use of grasses by elk in both the Steamboat and Prospect Herds. In these winters elk have to shift their diet to available shrubs including sagebrush, mountain shrubs, and willows. Elk are better competitors for winter forage than deer because they have this ability to shift their diet when preferred species become unavailable. Winter forage is utilized by elk until spring forbs become available. Forbs, wet meadow grasses, and grass-like species constitute the bulk of elk forage from spring green-up through the curing of forage in mid to late summer on most Sandy elk ranges. Fine-stemmed grasses on drier range sites generally constitute the bulk of the elk diet in fall, with forbs and shrubs comprising a minor portion of the diet.

Habitat Management Requirements for Maintenance

1. Elk in the Sandy area should be granted a forage allocation and a winter range forage reservation based on the following factors:

a. An animal unit equivalent for elk of 0.50, or 2.0 elk per AUM (King 1967).

b. Forage allocation for elk based on the following updated calculations for the Prospect and Steamboat Herds identified on MAPS 8A-4 and 8A-5. Estimated numbers of elk occupying seasonal ranges on national resource lands in the Prospect Herd are summer range (summer and winter-yearlong), 200 to 300; parturition range (critical parturition), 600 to 1,000; intermediate winter range (noncritical winter and winter-yearlong and critical winter, winter-yearlong), 600 to 1,000; and critical winter range (critical winter and winter-yearlong), 200 to 500. In most years since 1972 an estimated 50 to 75% of the Prospect elk have spent the most intense portion of each winter on Steamboat Unit critical winter range (Area A on MAP 8A-5).

Summer Range Forage Allocation.

300 elk divided by 2 elk/AUM = 150 AUMs
150 AUM x 5.5 months = 825 AUMs

Parturition Range Forage Allocation.

1,000 elk divided by 2 elk/AUM = 500 AUMs
500 AUM x 1.0 months = 500 AUMs

Intermediate winter range forage allocation to encompass variations in elk numbers between years on winter ranges and considering desired levels, the maximum number should be used for an AUM reservation.

1,000 elk divided by 2 elk/AUM = 500 AUMs
500 AUMs x 1.5 months = 750 AUMs

In order to alleviate problems of elk competition with deer on the winter range in the Squaw Teat-Little Sandy area, critical winter forage for at least 500 elk should be reserved in the Prospect Unit. This may be an option in the management of elk winter range, but should not be exercised unless measures are taken to minimize livestock use on critical winter ranges in the Steamboat Unit during the spring through fall period.

500 elk divided by 2 elk/AUM = 250 AUMs
250 AUMs x 4.0 months = 1,000 AUMs

c. Elk forage reservations for the Steamboat Herd should be made based on the following calculations for areas shown on MAP 8A-5. Estimated numbers of elk occupying seasonal ranges on BLM lands in the Steamboat Unit are as follows:

Area A—Summer (summer, winter, critical winter-yearlong, noncritical winter-yearlong), 250 to 400; parturition (critical parturition), 250 to 400; intermediate winter (winter, winter-yearlong, critical winter-yearlong), 250 to 400; and critical winter (critical winter-yearlong), 250 to 400 plus 400 to 600 for ingress from the Prospect Herd for a total of 650 to 1,000.

Area B—Summer (summer, winter-yearlong), 150 to 250; parturition (critical parturition), 150 to 250; intermediate winter (winter, winter-yearlong, critical winter-yearlong), 150 to 250; and critical winter (critical winter-yearlong, 150 to 250.

Area C—Summer (summer, winter-yearlong, critical winter-yearlong), 20 to 50; and winter (winter, winter-yearlong, critical winter-yearlong), 25 to 100.

Area D—Winter and summer (all ranges), 50 to 100. See TABLE 8A-5 for periods of seasonal range use.

Area A Summer Range Forage Allocation

400 elk divided by 2 elk/AUM = 200 AUMs
200 AUMs x 4.5 months = 900 AUMs

Area A Parturition Range Forage Allocation

400 elk divided by 2 elk/AUM = 200 AUMs
200 AUMs x 1.5 months = 300 AUMs

Area A Intermediate Winter Range Forage Allocation

400 elk divided by 2 elk/AUM = 200 AUMs
200 AUMs x 2 months = 400 AUMs

Area A Critical Winter Range Forage Allocation

1,000 elk divided by 2 elk/AUM = 500 AUMs
500 AUMs x 4 months = 2,000 AUMs

Area B Summer Range Forage Allocation

250 elk divided by 2 elk/AUM = 125 AUMs
125 AUMs x 4.5 months = 562 AUMs

Area B Parturition Range Forage Allocation

250 elk divided by 2 elk/AUM = 125 AUMs
125 AUMs X 1.5 months = 187 AUMs

Area B Intermediate Winter Range Forage Allocation

250 elk divided by 2 elk/AUM = 125 AUMs
125 AUMs x 2 months = 250 AUMs

Area B Critical Winter Range Forage Allocation

250 elk divided by 2 elk/AUM = 125 AUMs
125 AUMs x 4 months = 500 AUMs

Area C Summer Range Forage Allocation

50 elk divided by 2 elk/AUM = 25 AUMs
25 AUMs x 6 months = 150 AUMs

Area C Winter Range Forage Allocation

100 elk divided by 2 elk/AUM = 50 AUMs
50 AUMs x 6 months = 300 AUMs

Area D Summer Range Forage Allocation

100 elk divided by 2 elk/AUM = 50 AUMs
50 AUMs x 6 months = 300 AUMs

Area D Winter Range Forage Allocation

100 elk divided by 2 elk/AUM = 50 AUMs
50 AUMs x 6 months = 300 AUMs

2. A forage allocation for critical and noncritical elk winter ranges would not necessarily insure that summer-fall livestock use would leave adequate forage available to elk in winter. Therefore, the following considerations should be given to summer-fall livestock use of elk winter range:

(a) Summer-fall and winter livestock use of elk winter range, especially critical winter range, should be minimized to provide adequate available forage for elk on important feeding sites.

(b) Water should not be developed on critical elk winter ranges for use by livestock in summer or fall.

(c) Cattle should be herded in order to ensure better distribution and prevent concentrations of livestock on elk winter range.

3. Existing stands of basin big sagebrush in both elk herds must be maintained to provide yearlong escape cover for elk and to provide calving cover for the Steamboat Herd.

(a) Trend of vegetation used as cover should be monitored on all important elk use areas.

(b) In cases of elk cover deterioration, the causative agent should be removed or the habitat improved.

4. Aspen stands in foothill ranges and within the Steamboat Herd are in advanced stages of succession. Increased cattle use would result in accelerated deterioration of aspen and riparian habitats important to elk.

(a) Measures should be implemented to regenerate 5,000 to 8,000 acres of aspen-conifer and aspen-sagebrush associations over the next 20 years, using controlled burning and small irregular block cuts in aspen.

(b) Cattle use of aspen and riparian willow habitats should be decreased. Herding and fencing may be required to reduce livestock use in the Upper Big Sandy, Upper Little Sandy and Upper Sweetwater River drainages.

5. Forbs and wet meadow plants are important to elk in spring and summer. Excessive cattle grazing and trampling of wet meadow forage in summer causes deterioration of plants, decreased soil moisture, decreased grass and forb cover, and a shift to shrub vegetation or more xeric conditions (see Glossary). This problem could be alleviated by:

(a) Fencing the source of water and the storage reservoir and providing a spill pipe below the reservoir as a livestock water source. This would retain succulent vegetation for elk and food and cover for small wildlife species.

(b) Minimizing summer livestock use of important elk summer concentration areas where juxtaposition to water is an important component of their habitat.

Moose

Status

The Prospect Moose Herd primarily occupies the north and east portion of the Sandy (MAP 8A-6). The desired population level for the Prospect Herd is 100 post-hunt. Following the 1977 hunt, there were an estimated 60 to 80 moose in the herd. Observation of moose movement suggests that there is an interchange of moose across the Upper Sweetwater and Upper Big Sandy Rivers (Lockman 1977). A portion of the Upper Sweetwater moose herd (Hunt Areas 30 and 2) is also included in the Sandy, but population data for those units are not presented here.

Habitat Requirements and Management of Populations

Snow depth precludes the winter use of willow and aspen habitat north of Prospect Mountain, so moose move onto willow bottoms along the Big Sandy, Little Sandy, and Sweetwater Rivers. Moose elsewhere utilize low-growing shrubs and riparian willows as forage in fall and shift to a diet of willows in the winter (Wilson 1971; Houston 1968). Riparian and wet meadow grasses, emergent aquatics, and forbs are important spring and summer forage for moose (Houston 1968).

Willows in riparian zones and aspen and conifers adjacent to riparian habitat are used yearlong as insular cover by moose. Seral stages of aspen-conifer associations are used spring through fall (Wilson 1971). *Aspen-Ceanothus* associations receive a high degree of summer use and mountain shrub associations receive a amount of winter use by Lincoln Herd moose (Lockman 1977 and 1978).

Riparian willows in the Big Sandy, Little Sandy and Sweetwater drainages above Highway 28 and the irrigation project have been deteriorated. Habitat improvement measures should be implemented on the upper portions of these drainages to increase willow cover. Heavy utilization by livestock has largely contributed to this deterioration. Fencing of riparian zones to protect them from heavy livestock use and allow reestablishment of willow-shrub cover should be implemented on important segments of stream.

Aspen stands are in advanced stages of succession and being replaced by sagebrush and conifers. A long-term project to reestablish diversity of seral and advanced successional stages in aspen habitats on foothill ranges should be implemented. Habitat improvement would distribute livestock use better through increased forb and grass production. This would decrease the adverse impact of livestock use on riparian and aspen habitat types.

Forage should be allocated for moose yearlong according to the following factors:

a. 100 moose divided by 1.15 moose/AUM = 87 AUMs

87 AUMs x 12 months = 1,044 AUMs

b. Because of variations in moose density on seasonal ranges in the Prospect Herd between years, moose densities should be based upon the population objective for each herd unit and each seasonal range.

c. Competitive seasonal forage use and percent diet overlap.

d. Seasonal range use yearlong is: summer (summer, winter-yearlong range), May 1 to November 1 and winter (winter-yearlong, critical winter-yearlong), November 1 to May 1.

e. Livestock use of critical winter range (riparian willow habitat) should be minimized or excluded yearlong.

Future determinations of carrying capacity of moose should be based on moose use of current willow growth. This should not exceed 50% on riparian transects. Transects should include those willows most extensively utilized by moose in winter. Use should be monitored annually.

Sage Grouse

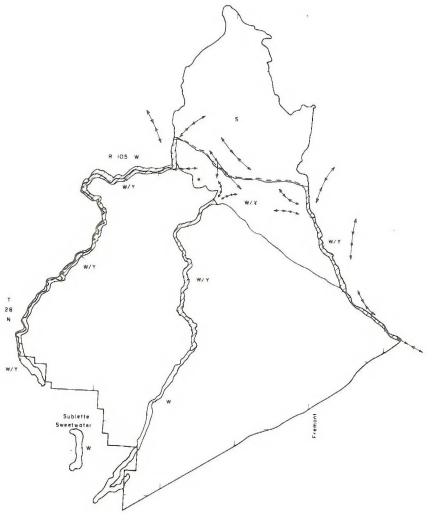
Status

The sage grouse population in the Sandy area has been relatively stable over the last 20 years. Harvest data for Sweetwater County suggest that annual variations in harvest are related to variations in production and brood survival. Decreases in breeding habitat occurred in and around the Eden-Farson Irrigation Project as a result of sagebrush control activities in 1950's and 1960's. A history of known past and present strutting grounds and breeding areas for southwestern Wyoming compiled in 1978 includes the Sandy area (WFGD 1978). Sage grouse seasonal range maps which include the Sandy area are available from the Wyoming Game and Fish Department. A systematic aerial search for new strutting-breeding complex locations was initiated in 1978.

Habitat Requirements and Management of Sage Grouse Populations

Patterson (1952) found that sagebrush comprised greater than 80% of the fall, winter, and early spring diet of sage grouse. Forbs were the dominant forage in late spring and summer. Sage grouse chicks are heavily dependent upon insects through four to six weeks of age and on forbs from six to twelve weeks. According to K. Bagdonas, University of Wyoming entomologist, insect production on arid shrub ranges in southwestern Wyoming is highly dependent upon spring moisture and the production of succulent forbs and grasses. Riparian and wet meadow sites with good vegetation production are important for producing insects and forbs essential to the rapidly-growing young sage grouse in dry summers.

Of 300 sage grouse nests found by Patterson (1952), 92% were under a sagebrush canopy. Braun *et al.* (1977) evaluated the results of several investigations of sage grouse habitat and indicated that the distance of nests



Map 8A-6

Moose - Prospect Mountain

from leks (strutting grounds) varied with the proximity of leks to quality nesting habitat. The lek-to-nest site distance varied from 12.9 kilometers (encompassing all nesting) to 3 kilometers (encompassing at least 75% of the nesting). Sagebrush heights used at nesting sites vary from 17 to 79 centimeters, with most nests located under the tallest bushes available (Patterson 1952; Braun *et al.* 1977). Stands of 20 to 40% canopy coverage are most frequently used for nesting. Successful sage grouse nests are found in significantly greater sagebrush canopy cover than unsuccessful nests (Wallestad and Pyrah 1974).

Autenrieth (1976), Gill (1965), Wallestad (1971), Klebenow (1969), and Oakleaf (1971) have all found that sage grouse broods use more open stands of sagebrush in early summer and as summer progresses either move upward in elevation following a gradient of green food plants or to riparian zones, wet meadows or lower mountain meadows. As summer ends and fall begins, broods become more dependent upon dense sagebrush. In the Sandy area, sage grouse broods depend upon rangeland forb and insect production early in the summer. In mid- to late summer they depend upon wet meadows, riparian habitats, irrigated haylands, pastures, and foothill mountain meadows with sagebrush and water in close proximity.

In dry summers sage grouse require some free water. Water sources spaced at 1½ mile intervals on arid summer sage grouse range are regarded as optimum for population maintenance. Dense stands of basin big sage or mountain big sage in draws or basins close to water offer good late summer and early fall cover for sage grouse in the Sandy area. Emergent aquatic plants, grasses, forbs, and shrubs along the shoreline of an aquatic system offer protective cover for sage grouse as well as a food supply of plants and insects.

Sage grouse in the Sandy area move variable distances from summer to winter range (Patterson 1952). In winter sage grouse utilize sagebrush stands with greater than 20% canopy coverage (Eng and Schladweiler 1972; Wallestad 1975).

Habitat maintenance and improvement projects on riparian and wet meadow sites should be implemented where deteriorating conditions exist. Sites which presently are good quality wildlife habitat should be maintained. Guidelines for the maintenance of sage grouse habitat (Braun *et al.* 1977) should be followed in the Sandy area in designing livestock grazing systems and range management practices. Range vegetation objectives should be designed with sage grouse habitat requirements in mind.

APPENDIX 9
LETTERS
WITH INDEX
NUMBERS
ASSIGNED

1a

MARTY & RAGSDALE
ATTORNEYS AT LAW
20 EAST FLAMING GORGE WAY
P. O. Box 231
GREEN RIVER, WYOMING 82935

LAWRENCE A. MARTY
CALVIN E. RAGSDALE
RICHARD J. MATHEY

TELEPHONE
307 875-3220

May 30, 1978

Mr. Neil F. Morck
District Manager
Rock Springs District
United Stated Department of the Interior
Bureau of Land Management
P. O. Box 1869
Rock Springs, Wyoming 82901

Mr. Dean F. Forsgren, Team Leader
United States Department of the Interior
Bureau of Land Management
Rock Springs Grazing District
Sandy Environmental Statement
P. O. Box 1869
Rock Springs, Wyoming 82901

RE: Sandy Environmental Statement.

Gentlemen:

The Board of Directors of Sandy Livestock Users Association and I have reviewed Alternative 4 in Chapter 8 of the above referenced Environmental Statement, that alternative being Pages 8-75 to 8-109. That alternative is designated as "Grazing Program as Proposed by the Sandy Livestock Operators."

Our initial review of the alternatives indicates that the narrative description and review by the Bureau of the alternative in the statement does not accurately reflect the proposals made by the operators and further indicates by its gratuitous nonetheless a prejudgment of the alternative by the Bureau and an improper attempted justification by the Bureau of its own proposed action. I have been instructed by my client to advise you that, as written, the Sandy Livestock Users Association completely disclaims the alternative as its own. I am further instructed by my client to advise you that nothing less than a complete rewrite, line by line, of the alternative designated as Alternative 4 will be sufficient to cause the association to claim the alternative as its own proposal.

To that end, we respectfully request that members of your staff meet with the Board of Directors of the association at an early date to discuss the necessary revisions. We are giving you this notice at the earliest possible date in order that revision may begin. The Board

1a

Mr. Neil F. Morck
Mr. Dean F. Forsgren, Team Leader
May 30, 1978
Page Two

of Directors will be willing to meet with your staff people at any reasonable time upon adequate notice.

We note from your press release and other correspondence that copies of the statement have come to some 400 persons for review. We respectfully request that you furnish a copy of this letter to all persons on your original mailing list or that, in lieu thereof, you furnish us with a copy of the mailing list in order that we may furnish all reviewers with a copy of this letter.

If you have any question concerning the foregoing, please advise me or any member of the Board of Directors of the Sandy Livestock Users Association.

Respectfully yours,

Calvin E. Ragsdale

CER/ah

1b

MARTY & RAGSDALE
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20 EAST FLAMING GORGE WAY
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LAWRENCE A. MARTY
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RICHARD J. MATHEY

TELEPHONE
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June 22, 1978

Mr. Dean F. Forsgren
Team Leader, Sandy ES Team
United States Department of Interior
Bureau of Land Management
Rock Springs Grazing District
P. O. Box 1869
Rock Springs, Wyoming 82901

RE: Sandy Environmental Impact Statement.

Dear Mr. Forsgren:

Enclosed herewith is a narrative prepared by the Sandy Livestock Users Association. The enclosed narrative is, we believe, a more accurate and a fairer description of the alternative submitted to the Bureau by the operators. We submit that the enclosed or something very similar to it should constitute the descriptive narrative in the final environmental impact statement for the Sandy Area.

You should consider this letter and the enclosed as part of the written comment which the Sandy Livestock Users Association is submitting with respect to the statement.

If you have any questions concerning the foregoing, please advise me.

Respectfully yours,

Calvin E. Ragsdale

CER/dlr

Enclosure

ALTERNATIVE 4 LIVESTOCK GRAZING PROGRAM AS PROPOSED BY THE SANDY OPERATORS

DESCRIPTION

Livestock operators who use national resource land in the Sandy Area for grazing have proposed alternative grazing management plans involving 26 allotments within the Sandy Area. Allotment boundaries and individual use pastures are shown on MAP 8-4 located at the end of this chapter. Allotment boundaries in the northeast unit are the same, with three or four exceptions, as those of the 1970 adjudication of that unit. The exceptions are that a new allotment "Bush Creek" is split out of Bush Rim Allotment (as adjudicated) and Red Desert Allotment (as adjudicated) is split into three allotments. Red Desert, Red Lake and Pinnacles, and a new allotment Water Hole Draw is split out of the Poston Allotment (as adjudicated). The operator proposals have been combined into similar categories by the Bureau for the purpose of analysis. The Sandy Livestock Operators' complete submission is available upon request for review from the Rock Springs District Office. A summary of each proposal by allotment is set out below.

Where the proposals of various operators differed for any particular area or allotment, the Bureau chose for

impact analysis what appeared to it to be the most intensive management proposed on the assumption that the more intensive the system, the higher the likelihood of adverse environmental impacts resulting from the imposition of the system. In some instances, the operators requested environmental analysis of range improvements which were identified by the Users as probably in excess of the minimum necessary, for the reason that they were advised by the Bureau that if such improvements were not now analyzed, such improvements could not again be considered until after all other environmental statements had been completed for the entire district (some ten to twelve years in the future). All of the Sandy Livestock Users Association proposals share certain assumptions, as follows: All Northeast Unit proposals presume that wildlife and wild horse forage reservations will fall on the particular allotment of actual use and that the licensed AUM's will be those of the 1970 adjudication. The proposed allotments in the Little Colorado Unit assume that boundaries have been adjusted for such reservations. Where positive movement dates are shown, it is assumed that such movement date is plus or minus five days, unless otherwise indicated, in order to adapt to the needs of the vegetation.

Range improvements are shown on TABLE 8-53 and MAP 8-5 located at the end of this chapter. Fencing proposals for the Bar X, Fish Creek and White Acorn Allotments are

existing fences. The Steamboat Mountain, Red Desert, Bush Rim and Continental Peak Allotments and portions of the Pacific Creek Allotment would be unfenced. The operators have proposed that many interior pastures remain unfenced and that a 10% to 15% (depending upon the particular allotment) drift of livestock would be allowed between pastures of the same allotment. Interior pasture boundaries that would be unfenced include the Little Sandy, Little Prospect, Buckhorn, Sublette, and Prospect Mountain Allotments.

In those cases where the operator's alternative with respect to water developments was not specific, the location and type of water development described in the proposed action were used for the purpose of analysis. Priorities for maintenance of existing range improvements would be established according to the needs of the resources.

Livestock use in unfenced allotments would be controlled by the operator through herding or supervised water control or a combination of the two. Range supervision for this alternative would involve BLM employees making routine allotment inspections to insure that wildlife, wild horses and livestock numbers and time of grazing use of pasture(s) comply with those proposed for each grazing system. Administrative actions related to unauthorized use (trespass) would be taken in accordance with BLM Manual 9230.

The grazing systems proposed by the operators are

varied and range from intensive to extensive. In the opinion of the Bureau and under its definitions, the proposals are generally variations of deferred grazing systems. Grazing systems (using the analysis assumptions set out above and Bureau definitions), class of stock, seasons of use, level of livestock use, and wildlife and wild horse reservations by allotment are shown on TABLE 8-48. In order to give the reader an opportunity to reasonably consider the systems proposed, the systems will be briefly summarized allotment by allotment. The brief summary will first consider the allotments in the Northeast Unit in alphabetical order and then those in the Little Colorado Unit in alphabetical order.

NORTHEAST UNIT

Bar X: The operator proposes to use the three existing fenced pastures as follows: YEAR 1: Enter Pasture 1 with all livestock (whether sheep or cattle) on June 1; leave Pasture 1 and enter Pasture 2 with All livestock on July 15, plus or minus five days; leave Pasture 2 and enter Pasture 3 with all livestock on September 1, plus or minus five days; leave allotment approximately October 15. YEAR 2: Enter Pasture 2 with all livestock on June 1; Leave 2 And enter 3, all livestock, on July 15, plus or minus five days; leave 3 and enter 1, all livestock, on September 1, plus or minus five days; leave allotment approximately October 15; YEAR 3: Enter 3, all livestock, on June 1; leave 3 and enter 1, all

livestock, July 15, plus or minus five days; leave 1, enter 2, all livestock, September 1, plus or minus five days; Leave allotment approximately October 15. Repeat sequence.

Buckskin-Sandy: The operator plan is unknown to this writer. The Bureau of Land Management should insert a description similar to the others contained herein.

Bush Rim: The operator proposes to divide the allotment into three approximately equal pastures. Use as follows: YEAR 1: Enter 1 and 2 with all livestock (whether sheep or cattle) on May 1; stay in 1 and 2, enter 3 with all livestock on approximately August 1; leave allotment on approximately October 1; YEAR 2: Enter 2 and 3 with all livestock on May 1; stay in 2 and 3, enter 1 with all livestock on approximately August 1; leave allotment on approximately October 1; YEAR 3: Enter 3 and 1 with all livestock on May 1; stay in 3 and 1, enter 2 with all livestock on approximately August 1; leave allotment on approximately October 1; repeat sequence.

Bush Creek: Operator plans unknown to this writer. The Bureau should insert a description similar to the others contained herein.

Continental Peak: The operators propose to continue their use as presently constituted. One user's present use is as follows: Enter the allotment with his licensed sheep on approximately June 1, leave allotment approximately July 10;

re-enter allotment on approximately October 1, leave allotment on approximately November 15. The other operator in the allotment has applied for conversion in class of livestock from sheep to cattle and pending decision has generally been taking non-use. If and when the application for conversion is approved, the operator will propose a grazing plan consistent with the location of the two operators' respective private and leased lands within the allotment, with the differing classes of livestock use of the two operators and with the needs and requirements of the resources.

Fish Creek: The operator plan is unknown to this writer. The Bureau should insert a description similar to the others contained herein.

Gold Creek: The operator plan is unknown to this writer. The Bureau should insert a description similar to the others contained herein.

Little Prospect: Two proposals were made for this allotment by the operators, as follows:

Sheep Management: Divide the allotment into five areas (pastures). Use as follows: YEAR 1: Enter 1 and 2 on May 1 with all sheep; stay on 1 and 2 and enter 3 and 4 on approximately May 16, plus or minus five days; leave 1 and 2 on approximately June 15, plus or minus five days; leave 4, stay on 3 and re-enter 1 on approximately July 15, plus or minus five days; stay on 1 and 3 and re-enter 2 and 4 on September 15, plus or minus five days;

leave allotment on October 15; YEAR 2: Enter 1 and 2 on May 1 with all sheep; stay on 1 and 2 and enter 3 and 4 on approximately May 16, plus or minus five days; leave 1 and 2 on approximately June 15, plus or minus five days; leave 3, stay on 4 and re-enter 2 on approximately July 15, plus or minus five days; stay on 2 and 4, re-enter 1 and 3 on approximately September 15, plus or minus five days; leave allotment on October 15. Pasture 5 is proposed as custodial pasture (mostly existing, some expansion). Repeat sequence.

Cattle Management: Divide allotment exclusive of Pasture 5 above into three areas. Use as follows: YEAR 1: Enter 1 on May 1 with all cattle; leave 1, enter 3 with all cattle on approximately August 1 (not later than August 10); leave 3, enter 2 with all cattle on approximately September 15, plus or minus five days; leave allotment on October 1; YEAR 2: Enter 2 on May 1 with all cattle; leave 2, enter 3 on approximate date of August 1 (not later than August 10) with all cattle; leave 3, enter 1 with all cattle on approximately September 15, plus or minus five days; leave allotment on October 1. Repeat sequence.

Little Sandy: The operator proposes to divide the allotment into five areas (pastures). Use as follows: YEAR 1: Enter with all livestock on approximately May 1; leave 1, enter 3 with all livestock on approximately June 10, plus or minus five days; leave 3, enter 5 with all livestock on approximately July 5, plus or minus five days; leave 5, enter 4

with all livestock on approximately August 12, plus or minus five days; leave 4, enter 3 with all livestock on approximately September 10, plus or minus five days; leave 3, enter 1 with all livestock on approximately September 20, plus or minus five days; leave allotment on October 1; YEAR 2: Enter 2 with all livestock on approximately May 1; leave 2, enter 3 on approximately June 10, plus or minus five days; leave 3, enter 4 on approximately July 5, plus or minus five days; leave 4, enter 5 on approximately August 12, plus or minus five days; leave 5, enter 3 on approximately September 10, plus or minus five days; leave 3, enter 2 on approximately September 20, plus or minus five days; leave allotment on October 15. Repeat sequence.

Pacific: The operator proposes that the following system be followed in the allotment. The use would be spring-summer-fall. At the beginning of each year, the operator and the area manager would review the area and after consultation, and in light of previous year's use, the condition of the forage and range, weather conditions, and other pertinent data would determine on what portion of the allotment to begin grazing for that year. Grazing (whether cattle or sheep) would be deferred on those portions of the allotment as necessary for the good of the range.

Pine Creek: The operator proposes that the allotment be divided into three areas (pastures). Use as follows:

YEAR 1: Enter 1 with all livestock (whether sheep or cattle) on approximately May 5, plus or minus five days; leave 1, enter 2, on approximate date of May 20, plus or minus five days; stay on 2, enter 3 on approximate date of August 1, plus or minus five days; leave 2 and 3, re-enter 1, on approximate date of November 20, plus or minus five days; leave allotment on approximate date of December 15, plus or minus five days; YEAR 2: Enter 1 with all livestock on the approximate date of May 5, plus or minus five days; leave 1, trail through 2, enter 3 with all livestock, on the approximate date of May 20, plus or minus five days; stay on 3, enter 2 on the approximate date of August 1, plus or minus five days; leave 2 and 3, enter 1 with all livestock on the approximate date of November 20, plus or minus five days; leave allotment on the approximate date of December 15, plus or minus five days. Repeat sequence.

Pinnacles: This would be a new allotment in the Northeast Unit split out of the Red Desert Allotment (as adjudicated). The allotment would be fall sheep and cattle use. The operators propose that the following plan be followed: Livestock (whether sheep or cattle) would go on the allotment on the approximate date of October 1, plus or minus five days, and would leave the allotment on December 15, plus or minus five days.

Poston: The operators propose that a new allotment be carved out of the Poston Allotment as adjudicated (see

Water Hole Draw). The remainder of the allotment would be divided into two areas (pastures). An allotment would be created in the Little Colorado Unit to be known as the Boundary Allotment. Both the Poston Allotment and the Boundary Allotment would be managed under a joint venture. Two management plans are proposed, one for sheep, one for cattle, as follows:

Sheep Management: YEAR 1: Enter 1 and 2, Poston, with all sheep, on the approximate date of May 1; continue to use 1 and 2, Poston, and enter Boundary, on the approximate date of May 25, plus or minus five days; continue to use 2, Poston, and Boundary, leave 1, Poston, on the approximate date of July 15, plus or minus five days; continue to use Poston 2 and Boundary, re-enter Poston 1, on the approximate date of September 1; leave the allotment on the approximate date of December 15; YEAR 2: Enter Poston 2 and Boundary Allotment with all sheep on the approximate date of May 1; continue to use Poston 2 and Boundary, enter Poston 1 on the approximate date of May 25, plus or minus five days; continue to use Poston 1 and Boundary, leave Poston 2 on the approximate date of July 15, plus or minus five days; continue to use Poston 1 and Boundary, re-enter Poston 2 on the approximate date of September 1, plus or minus five days; leave the allotment on the approximate date of December 15; YEAR 3: Enter Poston 1 and Boundary with all sheep on the approximate date of May 1; continue on Poston 1 and Boundary, enter Poston 2 on the

approximate date of May 25, plus or minus five days; continue on Poston 1 and 2, leave Boundary on the approximate date of July 15, plus or minus five days; continue to use Poston 1 and 2 and re-enter Boundary on the approximate date of September 1, plus or minus five days; leave the allotment on the approximate date of December 15; repeat sequence.

Cattle Management: YEAR 1: Enter Poston 1 and 2 with all cattle on the approximate date of May 1; leave Poston 1, continue on Poston 2 and enter Boundary on the approximate date of July 15, plus or minus five days; leave the allotment on the approximate date of September 15; YEAR 2: Enter Poston 2 and Boundary on the approximate date of May 1 with all cattle; leave Poston 2, continue on Boundary and enter Poston 1 on the approximate date of July 15, plus or minus five days; leave the allotment on the approximate date of December 15; YEAR 3: Enter Poston 1 and Boundary on the approximate date of May 1 with all cattle; leave Boundary, continue on Poston 1 and enter Poston 2 on the approximate date of July 15, plus or minus five days; leave the allotments on the approximate date of December 15. Repeat sequence.

Red Desert: The proposal of the users esentially suggests the creation of two new allotments within the Red Desert Allotment as adjudicated (see Pinnacles, covered above, and Red Lakes, covered below). For the remainder of the Red Desert Allotment, the following proposed management plan was

made. The use in the allotment would be spring-summer-fall. At the beginning of each year, the operators and the area manager would review the area and after consultation, and in light of previous years' use, the present condition of the forage and range, weather conditions, and other pertinent data, would determine on what portion of the allotment to begin grazing for that year. Grazing (whether cattle or sheep) would be deferred on those portions of the allotment as necessary for the good of the range.

Red Lake: Two proposals are made by the operator. Both are for either cattle or sheep, but each has a different period of use. In years during which the user was grazing sheep, the area adjacent to the sheering facilities at the Bar X Ranch would be used during the time of sheering and would not again be re-entered during that grazing year. In years when the area was not being used for sheering, it would be used as a part of either of the management plans proposed. The proposed plans are as follows:

Fall Use Management: Enter the allotment between the dates of September 1 and 15 with all livestock (whether cattle or sheep, except as set out); leave allotment between the dates of December 1 and 15;

Summer-Fall Use Management: YEAR 1: Enter the south portion of the allotment on approximately May 15, plus or minus five days, with all livestock; hold livestock to the south portion

of the allotment until the approximate date of August 1, plus or minus five days, at which time grazing would be allowed throughout the allotment; YEAR 2: Enter the north portion of the allotment on the approximate date of May 15, plus or minus five days, with all livestock (whether sheep or cattle, except as noted above); hold to the north portion of the allotment until the approximate date of August 1, plus or minus five days, at which time livestock would be released to use the entire allotment; leave allotment on the approximate date of December 15, plus or minus five days.

Sands: The user proposal proposes to divide the allotment into two areas (pastures). Use as follows: YEAR 1: The DeLambert cattle enter 1 at the north end on approximate date of May 1, and are held in the north portion until June 1, at which time the said cattle are released into the entire pasture, and Dearth-Jamieson and Chilton livestock enter 1 from the south on approximately May 1; leave 1, enter 2 on the approximate date of August 1, plus or minus five days, with all livestock, movement to be achieved in approximately 15 days; leave allotment on the approximate date of December 1, the DeLambert cattle remove north and the Jamieson and Chilton cattle remove south; YEAR 2: The DeLambert cattle enter 2 on approximately May 1 from north and are held in north portion of 1 until approximately June 1, at which time such cattle are released throughout 2, Jamieson and Chilton livestock enter

2 from south on approximately May 1; leave 2, enter 1 on approximate date of August 1, plus or minus five days, move to be achieved by the approximate date of August 15; leave allotment on approximate date of December 1, the DeLambert livestock removing north and Chilton and Jamieson livestock removing south from 1.

Sheep Management: Enter allotment after November 1 from the northwest into 1 and proceed through the allotment, as user desires, continuing through allotment and departing the allotment from the south into Rock Springs Grazing Association lands, it being presumed, but not required, that the sheep use would use the area not being used by cattle.

Steamboat Mountain: The operator proposes to divide the allotment into two areas (pastures). Use as follows: YEAR 1: Enter 1 with all livestock on the approximate date of May 15; continue in 1 and enter 2 on the approximate date of August 1, plus or minus five days; leave allotment on the approximate date of November 1; YEAR 2: Enter 2 on the approximate date of May 15 with all livestock; continue in 2, enter 1 on the approximate date of August 1, plus or minus five days; leave allotment on November 1. Repeat sequence.

Prospect Mountain: The operator plan is unknown to this writer. The BLM should insert a description similar to the others contained herein.

Reservoir: The operator plan is unknown to this

writer. The BLM should insert a description similar to the others outlined herein.

Water Hole Draw: The operator proposes that a new allotment be severed out of the Poston Allotment. The following use is proposed. On approximately May 20, the operator will enter the allotment with his sheep and will lamb in the area; on the approximate date of July 14, plus or minus five days, the operator will remove his sheep from the allotment; between the dates of September 15 and October 5, the operator will re-enter the area with his sheep and will remain on the allotment until the approximate date of November 1 to 15, at which time all sheep will be removed from the allotment.

White Acorn: The operator plan is unknown to this writer. The BLM should insert a description similar to the others contained herein.

Willow Creek: The operator proposes to manage this allotment in conjunction with his Atlantic City Allotment within the Lander Resource Area of the Rawlins Grazing District. Use would be as follows: YEAR 1: Enter Atlantic City Allotment with all livestock on the approximate date of June 1, plus or minus five days; leave Atlantic City Allotment, enter Willow Creek Allotment on the approximate date of August 7, plus or minus five days, removal to be accomplished in approximately ten days from the move date; leave allotment on the approximate date of October 7, plus or minus five days; YEAR 2:

Enter Willow Creek Allotment with all livestock on the approximate date of June 1; leave Willow Creek Allotment and enter Atlantic City Allotment with all livestock on the approximate date of August 1, plus or minus five days, movement to be accomplished in approximately ten days from the move date; leave allotments on October 7, plus or minus five days; repeat sequence.

LITTLE COLORADO UNIT

Boundary: See Poston Allotment above under Northeast Unit.

Buckhorn: It is proposed that a new allotment be created in the Little Colorado Unit to be known as the Buckhorn Allotment. The allotment would be a private allotment. The user proposes that the allotment be located in the northwest portion of the Little Colorado Unit and that the allotment be divided into two areas (pastures). Use as follows: YEAR 1: Enter 1 with all livestock on the approximate date of May 10, plus or minus five days; continue in 1, enter 2 on the approximate date of August 1, plus or minus five days; leave the allotment on the approximate date of September 15, plus or minus five days; YEAR 2: Enter 2 with all livestock on the approximate date of May 10, plus or minus five days; continue on 2, enter 1 on the approximate date of August 1, plus or minus five days; leave the allotment on the approximate date of September 15, plus or minus five days; repeat sequence.

Eden: It is proposed by the operators that a new allotment be created within the Little Colorado Unit to be known as the Eden Allotment to be located in the southeast and centraleast portion of the unit. The operatora propose that the allotment be divided into two areas (pastures). Use as follows: YEAR 1: Enter 1 with all livestock on approximately May 10, plus or minus five days; leave 1, enter 2 on the approximate date of August 1, plus or minus five days, movement to be accompliahed within approximately ten days after movement date; leave allotment on the approximate date of October 31, plus or minus five days; YEAR 2: Enter 2 with all livestock on the approximate date of May 10, plus or minus five days; leave 2, enter 1, with all livestock, on the approximate date of August 1, plus or minus five days, movement to be accomplished within approximately ten days after movement date; leave the allotment on the approximate date of October 31, plus or minus five days; repeat sequence.

Lombard: It is propoaed that the boundaries of the established allotment within the Little Colorado Unit known as the Lombard Allotment in the aouthwest portion of the Little Colorado Unit be expanded to make the allotment of sufficient size to contain the licensed use of the two operators identified in the proposal. The operators propose that the allotment be divided into three areas (pastures). Use as follows: YEAR 1: Enter 1 and 2 with all livestock (whether sheep or cattle) on

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May 1; continue in 1 and 2, enter 3 with all livestock on approximately August 1; leave allotment on applicable license date; YEAR 2: Enter 2 and 3 with all livestock on May 1; continue in 2 and 3, enter 1 with all livestock on approximately August 1; leave allotment on applicable license date; YEAR 3: Enter 3 and 1 with all livestock on May 1; continue on 3 and 1, enter 2 with all livestock on approximately August 1; leave allotment on applicable license date; repeat sequence.

Sublette: The operator plan is unknown to this writer. The BLM should insert a description similar to the others contained herein.

Common: It ia proposed that the remainder of the Little Colorado Unit be designated an allotment to be known as the Common Allotment. Use in that allotment would be as follows: The use would be for fall sheep and for fall cattle, except as noted hereafter. The fall sheep use would be from approximately October 15, plus or minua five days, to December 15, plus or minus five days, and fall-winter cattle use would be from September 15, plus or minus five days, to February 28. The limited amount of summer cattle use would be allowed to continue for the operators presently existing with such use within the unit. Such uae would be restricted to the extreme west side of the allotment, along the Green River, and the users would alternate use areas each year by water and herding control to effect a deferred use management system within that particular area. Wild horse reservations and use would be made within the Common Allotment.

STATEMENT OF SANDY LIVESTOCK USERS
ASSOCIATION ON
SANDY DRAFT ENVIRONMENTAL IMPACT STATEMENT

This statement ia submitted on behalf of the Sandy Livestock Users Association by its attorney, Calvin E. Ragsdale. Of necessity, it will be general. The draft Sandy Environmental Impact Statement (hereinafter EIF) took the Bureau of Land Management some two years, more or less, to complete. The public is expected to submit rational comment on it in a apace of 52 days (including the seven day extension for written comments and assuming one received the document on the release date of May 26, 1978). In that period of time, one is expected to wade through some 600 pages, more or less, of small type and cloaely apaced lines, analyze some 297 amall-type tables and their underlying data (in those rare situations where underlying data is presented)--not to mention some 50 plus maps (some of which are almost impossible to read because of poor color gradation and some of which simply do not conform to reality, e.g. Map 1-5)-- give rational thought to what is presented, attempt to discover whether there is anything in the world to support the conclusions reached by the Bureau (one having to look to the world, since so little data of substance is placed in the statement), go to the Bureau offices (that is where the Statement refera one) for many, many studies, and finally attempt to present written, specific comments on the Statement's shortcomings. In the case of an EIS properly prepared, the time allotted might be sufficient for the purpose. In the case of the Sandy EIS, a six month comment period would seem to be more in order. It would appear that it would take one month of that time for a competent secretary to type the manuscript of comments on the shortcomings in the Draft.

To begin, a review of the Draft indicates that the Bureau haa no real feel for what an EIS is supposed to accomplish. It is not supposed to be a sales job for the proposed action. It is supposed to be a complete, objective, comprehenaible (to the intelligent, non-scientist layman) description and analyais of the proposed action and of the reasonably anticipated environmental and other impacts resulting from such action, together with a complete, objective, comprehensible (to the intelligent, non-scientist layman) description and analysis of all the reasonable alternatives to the proposed action (whether or not such alternative is within the legal capabilities of the agency concerned to achieve), toghether with a complete, objective, comprehensible (to the intelligent, non-scientist layman) of the reasonably anticipated environmental and other impacts of each of the alternatives. Such environmental and other effects are not limited to the agency's own lands or the federal government's own lands. If such were the case, the courts could have ignored all the post office building cases, since in most such casea, there were limited environmental impacts on the federally owned landa. The courts have not ignored such cases.

The sales job in the Sandy EIS has been apparent to almost every person commenting on the Statement. The attorney for the Sandy Livestock Users Association devoted considerable time to just reviewing the sales job on the first few pages of the Statement in his comments at the public hearing on June 28, 1978. There ia no need to repeat those statements here or to make further comment on the fact, except to state that the salesmanship ia not limited to the

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firat few pages. It permeates the entire Statement and poisons the entire effort.

In many instances, the analysis of impacts seems to be different from place to place within the Statement. For example, under the analyais of the effects of the proposed action on terrestial wildlife (antelope specifically), the Statement indicatea that there are certain factors which could affect the aurvival of antelope within the area, among them being fences, forage availability, winter habitat and so forth. The Statement states that under the propoaed action, there would be an approximate 5% loss of antelope. However, one is not told how one gets to this concluaion. Hard digging and review of the tables accompanying the text does not help.

Then, in the analysis of the same animal under Alternative 4, the reader is told that there will be a loss of from 10% to 50% in the population. In that analysis, it is indicated that the impacts shown assume a worst case situation that would result if all adverse conditions were to occur simultaneously. The reader is not told what these factors are and the language (and so far as one can tell, the analysis) is not used under the proposed action analysis. So, the reader is left in a situation where a proposed action involving some 500 plus miles of fences (many covering antelope migratory areas and critical winter habitat) will have less adverse impact on the antelope than a proposal with only 300 plus milea of fencing and considerably fewer fences affecting migration and winter habitat.

One wonders about conaistency of analysis between alternativea and the proposed action. One wonders if he had the time to give adequate consideration to each page of the Statement how many more such examples he would find. One sees other inconsistencies in the socio-economic and in the other wildlife areas.

For example, the reader is told that moose habitat is primarily willow oriented and that use of willows by livestock ia highly competitive with moose and that under the proposed action(and presumably other alternatives), there would be adverse effecta on moose because of increased willow use. Also, the livestock use, the reader is told, would advcracly affect the riparian habitat and aquatic habitat through effects on willows and stream banks. The reader ia given maps showing critical moose habitat. Then, we are given a mitigation measure (see mitigation measure 4 at page 4-1). The mitigation measure is to fence 26 exclosures on approximately 26 miles of streama within the area. We would thus mitigate by fencing out livestock. One assumes that one would also fence out moose. However, in the analysis of the effectiveness of the mitigating measures (aee page 4-10) we are told that restricting the livestock use on willows would reduce the moose mortality by 5% by providing ample forage for mooae. This gives rise to several questions. If we open the gates to the moose, will not the livestock also enter? If we only open the gates when livestock are not around, are not the moose and livestock competing more heavily in the areaa not fenced? Is there an offsetting increase in intensity of use of the non-fenced areas which militates against the assumed improvements in the fenced arcas? Do not moose cause the same effects on riparian and aquatic habitat as livestock? Where is the analysis concerning moose effects on the riparian and aquatic habitat?

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Further, under Alternative 2, the elimination of livestock grazing on the public lands, the reader on pages 8-34 through 8-42 is presented with a scenario wonderful for the wildlife fan. Tremendous increases in the number of wildlife would be anticipated. Under the consideration of moose habitat under the proposed action, the reader is advised that all grazing animals use willows to some extent, some greater, some lesser. Yet, there is no analysis of the effect of the increased numbers of wildlife on the willows and, thereby, the riparian and aquatic habitat. Under the high end of the scenario, one could have some 42,500 head of wildlife in the area. The Statement does not address the question of whether the increase in wildlife would have an adverse effect on riparian and aquatic habitat. Given the conclusion on page 8-42, one must assume that it does not, yet the question is not specifically addressed. Do not wildlife also congregate on the streams, given the chance?

In other instances, the Statement is striking in its failure to consider immediate potential impacts to the lands resulting directly from the proposed action. Two years ago, the Sandy Livestock Users Association, at the public input meetings held by the BLM to receive input on the proposed action and the proposed environmental impact statement, raised several potential environmental impacts to be considered by the Bureau. The users specifically requested that the Bureau address such potential impacts. A review of the Statement does not reveal any addressing of certain of the questions. For example, on page 12 of the written statement submitted by the Users in May, 1976, to the BLM, it was stated:

> We are concerned that the intensification of concentration of use necessitated by any rest-rotation system, under the varied soil, vegetative, and climactic conditions presented within the study area, may actually harm and damage the range rather than improve it. The users specifically request that any environmental analysis consider closely the question of whether "flogging the range" will lead to deterioration.

The Statement does not specifically address the question, although at least one study of an intensive management system indicated deterioration of the range which took several years of non-use to restore. (See Herbel, "Grazing Systems on Native Range," Beef Symposium 1973). This question was not only raised by the users, but was also raised by the Wyoming Game & Fish Commission, both in its oral comments at the imput meetings in May, 1976, and in its written comments, submitted from time to time to the Bureau. Further, the question was raised by certain environmental groups two years ago.

The users, the Wyoming Game & Fish Commission and the environmentalists all raised the question of the potential unknowns of the Bureau's proposed action, and directly or indirectly raised the question of what if the Bureau's assumptions were not correct. Toward this end, the users, on page 12 of the Statement submitted in May, 1976, stated as follows:

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> "Further, it should be noted that trend data is generally considered necessary before attempting to analyze what, if any, type of management plan will be successful. In light of the foregoing, the users seriously question whether the massive and significant changes in range use and practice proposed in these AMP's are necessary or desirable. The users would submit that no management plan should be considered until the necessary and proper trend data has been obtained which shows the necessity and desirability of a particular management plan. The environmental impact statement should focus on the potential adverse environmental impacts which might be obtained in adopting plans which do not have underlying relevant factors considered."

A close analysis of the proposed action and of the statement will indicate that the Bureau still does not have the necessary trend data. The statement indicates that trend data is "apparent". See page 2-63 of the Statement and Appendix 2I. A close reading of the impacts and improvements section indicates the Bureau is banking solidly on the assumed increased forage which it believes will result from the intensive management plans it has proposed (See, for example, its comments on improved stream stability and on the effects to antelope losses from fencing). Given that assumption, the reader should then have a relatively good explanation of the scientific basis upon which he is to depend to achieve the laudable goals of the Bureau.

However, when the reader looks, what does he find: in Appendix 2I, he is given the old ocular reconnaissance method of determination, which is then applied to the faf-puf system. Then, he slips over to the soil conservation service "excellent condition" criteria for determining potential site production in pounds of forage. That is then averaged and multiplied times the range average. Then, on the basis of the studies cited in Chapter 3 (ignoring all of those that disagree with the Bureau), the Statement makes the assumptions set out on page A-48. There is no justification of the assumptions, they are simply made and from the Statement one does not know why. Herbel and the local study (see citation in Ragsdale's oral testimony on June 28, 1978) indicate that no real conclusions can be drawn. The Bureau of Land Management is playing with two million acres of valuable resource, offsetting critical environmental impacts with assumed increase forage production based on assumptions which are never vigorously analyzed or justified in the Statement. At every level in the chain of the analysis, there are significant subjective determinations. The subjective determinations are to be found as follows:

1. The present range condition.
2. The present trend.

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3. The on-site excellent SCS determination.
4. That grazing plans work on these various factors.
5. That grazing plans will work in these specific instances.
6. That the plans will work with such specificity that the Bureau can make long-range specific percentage determinations based on them.

All of the foregoing is determined with nominal, at best, site specific inventory data. From all of these subjective determinations, none of which is adequately tied to any scientific basis or analysis, beautiful tables are constructed with very specific percentage changes, which are then depended upon to offset most, if not all, critical environmental impacts (whether to wildlife, wild horses or livestock operations).

There is similar analysis throughout the study. On page 2-27, the reader is given sediment yields. He is specifically told that the method is subjective. There is no description of the system. He is referred to Appendix 2-F. In Appendix 2-F, he is referred to Table 2-F-1 with a cryptic reference to the BLM Manual. Few readers of an environmental impact statement have access to a Bureau of Land Management Manual. From this, however, the reader is given a beautiful table like Table 2-11. However, nothing can be found in the Statement to justify Table 2-11.

The Statement needs more analysis in order for the reader to determine whether or not the Bureau's conclusions are valid.

The most striking example of this is to be found on page 1-8 of the Statement. It is stated that a benefit-cost study was conducted on each AMP to determine whether it is an economically feasible plan. It is stated that results of the b/c analyses are shown in Table 1-7. Table 1-7 is barely understandable after a review of the glossary. However, nowhere does the Bureau explain what it perceives as a benefit-cost analysis. Nowhere does the Bureau indicate what factors it considers to be benefits. Nowhere does the Bureau indicate what it considers to be costs. Nowhere does it give any analysis at all concerning the benefit-cost analysis. There is simply the bare statement and a reference to studies in the Bureau office. The other economic sections are much the same, whether under the proposed action or under the alternatives. Conclusions are stated, with little or no indication of the analysis followed to reach the conclusions or what factors were used in the analysis which is not described.

Nowhere in the statement is the interrelationship of privately owned and leased lands vis-a-vis the public lands considered. The Bureau blithely assumes that all uses on the privately owned and

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leased lands will continue the same, no matter what the result under the proposed action or any alternative. The critical interrelationship between privately owned and leased lands and federal lands has been recognized by many authors, including M. Clawson and B. Held, The Federal Lands: Their Use and Management (1957 ed.) and the Public Land Law Review Commission, One-Third of the Nation's Lands (1970). The lands are interdependent. The privately owned and leased lands are dependent upon the federal lands for their use as integral portions of livestock operations; many of the uses of the public lands are dependent upon the privately owned and leased lands for uses made upon the public lands (as a close examination of the information contained on Maps 1-2 and 2-25, specifically in the Pine Creek, Fish Creek, Bar X, Gold Creek, White Acorn, Little Sandy-Little Prospect, Prospect Mountain, Poston, and Reservoir allotments would indicate).

Alternative two indicates that many livestock operators would have to go out of business. Many livestock operators believe they would have to go out of business if the proposed action were implemented. Given that an operator would have to go out of business, what economic choices are left him with respect to his privately owned lands? The tax expense of said lands goes on, whether or not used. What would be the environmental impacts of the economic choices available to the private land owner if he could not use the lands for grazing operation purposes? This question is nowhere considered, so far as the users can tell, anyplace in the statement.

Other instances of the "blinders" approach of the Bureau in its consideration of potential environmental impacts can be found. For example, Table 8-29 (incidentally, without any apparent support) indicates substantial increases in visitor use under alternative two. Presumably, this means more people use of the lands. There is no analysis or consideration of what the environmental impacts of increased people use of the lands would be. Would there be increased degradation of water quality as a result? Would there be impacts on wildlife? The reader does not know, for the question is neither raised nor analyzed.

Finally one considers alternative four. The Sandy Livestock Users Association has heretofore submitted written comment on Alternative four. As written, it is difficult, if not impossible, from the description to determine what the proposals were. The Association has heretofore submitted its suggestion as to how the narrative should read. However, Table 8-49 would seem, in some instances, to be misleading in definitional classification. For example, the Little Sandy Allotment is described as a migratory five pasture. The users would submit that it is a combination of 2 two-pasture deferred systems, with a single pasture essentially used for trailing. For example, the Little Colorado Boundary

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allotment is described as season long. The users would submit that, in conjunction with Poston Allotment, it is in reality a three-pasture deferred system. For example, the Common Allotment in the Little Colorado is described as a season long. The users would submit that it is in reality a combination of two systems. One system is a deferred two-pasture system, the other is a deferred one-pasture system. For example, Red Desert is indicated as a season long. However, the users would submit that it is the most intensive management system of all, inasmuch as it is a system devised specifically for large, arid areas. The users' attorney likes to refer to it as the New Mexico chase system (see Stoddart, Smith and Dean, Range Management (3rd ed.) at pages 294-5.) The same comments as made with respect to Red Desert can also be made with respect to Pacific Creek Allotment. The foregoing becomes extremely critical when one considers that all of the critically determined increases in forage rest precisely on the assumptions made on page 4-48, which in turn rests precisely on the definitional categorization given a particular plan.

Finally, there are ~~some~~ simply ~~glaring~~ inaccuracies within the Statement. On page 4-31 it is stated "Wyoming fence law provides that on open range it is the responsibility of the individual operators to control livestock from straying onto adjacent land." The Wyoming law as between private operators is that, in the absence of evidence indicating a willful trespass, a landowner has the duty to "fence-out" livestock and, ~~in the absence of a legal fence,~~ has no recourse against the owner of livestock ~~unwillfully~~ trespassing his lands. The law concerning federal lands is somewhat confused, although the federal courts have, on more than one occasion, indicated that state fence laws, under varying conditions, did not apply to the federal government. However, the Supreme Court seems consistently to have left the precise limits of the rule open. "Open range", under Wyoming law, means precisely that. If a private landowner wishes to keep his neighbor's livestock off his lands, under Wyoming law, he builds a legal fence. Thus, while the conclusion reached by the Bureau in the Statement may or may not be ~~for~~ the best one, the reason cited for the conclusion is certainly not the case.

This statement could go on and on, given the time to prepare it. Under the circumstances, the users have simply attempted to point up, both generally and by specific example, some of the deficiencies in the draft Sandy Environmental Impact Statement. The users again go on record as opposing the Statement and any implementation of the proposed action contained therein for the reason that the draft is totally inadequate under the terms of the National Environmental Policy Act of 1969. The users further urge the Bureau of Land

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Management to rewrite the draft environmental statement in order to produce an adequate enviromental statement which considers those things which an environmental statement should properly consider. It is the feeling of the users that the draft environmental statement presented does not achieve that end.

Respectfully submitted,

SANDY LIVESTOCK USERS ASSOCIATION

By /s/ Calvin E. Masdale
Calvin E. Masdale
Attorney for the Association

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The State of Wyoming

OIL AND GAS CONSERVATION COMMISSION
STATE OIL AND GAS SUPERVISOR

CASPER

June 2, 1978

Dean F. Forsgren
Team Leader
U. S. Bureau of Land Management
Sandy Environmental Statement
P. O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Forsgren:

I have been furnished a copy of the Sandy Grazing Environmental Statement, which certainly is a monumental work which could only have been undertaken by the Federal Government.

There is one small portion of the statement devoted to mineral resources that I could find on Page 2-142. An erroneous statement is made that "the area does not contain any major geologic structures that could contain a significantly large oil or gas strike." I do not understand how the Bureau of Land Management can evaluate an area of this size and make that statement.

Likewise, it was reported that twenty to thirty new wells are being drilled each year. I reviewed our records and for the year ending March 31, 1978, ten wells were drilled in the Sublette County portion of the area; thirty-five were drilled in the Sweetwater County portion; two were drilled in the Fremont County portion; and twelve were in the Lincoln County portion, for a total of 59 wells during the year, which is considerably more than was reported in the Impact Statement.

Likewise, there are at least 15 fields producing in the area, most of which I admit are along the western edge in the LaBarge Platform Area, although there have been some recent discoveries that are edging out into the center of the proposed grazing unit. Rainbow Resources' well in Section 34, Township 27 North, Range 103 West, projected to test the Madison Formation at 25,000 feet, is an example of the hidden structures that could underlie a good bit of the area, making the broad statement that there are no structures rather ridiculous. Obviously, Rainbow

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Page 2 - Mr. Dean F. Forsgren, U. S. Bureau of Land Management,
Re: Sandy Environmental Impact Statement - 6-2-78

Resources feels that this feature has very good potential or they would not be spending the $10,000,000.00, plus, for the drilling of this prospect.

In summary, I would certainly hope that the outcome of the Impact Statement would not in any way hinder or impede oil and gas development in the area, which has terrific potential.

I am attaching a copy of the Energy Resources Map, compiled by the Wyoming Geological Survey in 1975, that reflects where all of the producing oil and gas fields are located up to that time. I have inserted, in pen, some of the discoveries since that time along with the location of the Rainbow Resources well.

If there is anything further that I can furnish you by way of oil and gas data, please feel free to contact me.

Very truly yours,

/s/ Donald B. Baske

Donald B. Baske,
State Oil and Gas Supervisor

DBB:wal
Enc.

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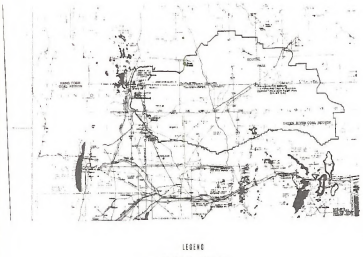

3

Sweetwater County Planning & Zoning Commission

P.O. Box 791
GREEN RIVER, WYOMING 82935

Telephone [307]
Green River, 875-2611 Ext. 42
or
Rock Springs, 362-7070 Ext. 42

June 19, 1978

Mr. Dean F. Foregren
Team Leader
Bureau of Land Management
Sandy Environmental Statement
P. O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Foregren:

The Sweetwater County Planning and Zoning Commission wishes to submit a "no comment" on the draft environmental statement on proposed livestock grazing management in the Sandy area.

Yours very truly,

Robert Volpie

Robert Volpie, Chairman
Sweetwater County Planning and Zoning Commission

RV/va

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AGRICULTURAL EXTENSION SERVICE

College of Agriculture, University of Wyoming, and U. S. Department of Agriculture Cooperating

Community Services
Room 116 Ivinson Building
Box 3923, University Station
Laramie, Wyoming 82071
Phone: (307) 766-3372

22 June 1978

Dean F. Foregren
Bureau of Land Management
Sandy ES Team Leader
P. O. Box 1869
Rock Springs, Wyoming 82901

I have several comments regarding the draft environment statement of proposed grazing management in the Sandy Area of Southwest Wyoming:

1. Appendix pages A-59 and A-63, heading A and B: The use of this type of ratio procedure for estimating the number of man-equivalents involved in running livestock on the BLM lands is fine for descriptive purposes but it is inappropriate for any type of impact predictions or projections. Studies have shown that relationship between labor requirements and public lands AUMs consumed in a livestock operation are not linear when the public lands resource is removed. This is because of the dependent nature of the relationship between the private and public lands mix in an "average" livestock operation. When the public lands cut back X number of AUMs the total ranch looses a disproportionally larger amount of AUs due to the necessity of modifying resources to account for the loss of [frequently] irreplacable summer range. So, whereas this ratio method probably is an adequate indication of the number of man-equivalents involved in a total operation needed to run the livestock on public lands, it is not an appropriate methodology for estimating the number of man-equivalents that would be lost if the public lands were removed.

2. Appendix page A-63, recreation income heading: The values per animal which are presented in this section are questionable. Why is there such large variation between the various dollar costs of hunting the different types of game? It would appear to me that the difference is due (at least in part) to the mix between local (in area) and out-of-area hunters. If this is the explanation, or part of it, then I feel it should be clearly delineated.

   Titling this section "income" would seem to be a gross misnomer; this section should be called something like "gross dollar flows in an economy generated by recreation expenditures".

   The use of this measure of the value of recreation to determine the impact of public land use decisions where recreation is a competing use (with livestock grazing, for instance) is inappropriate and incorrect. There are

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two major problems with using this yardstick for recreation activity: (a) there is no separation of the portions of the dollars spent by the hunters which accrue in the local economy vs somewhere else. This is important because only dollars spent locally will impact the local economy, and (b) only dollars spent by out-of-area hunters effect economic growth of the area. These dollars which come from outside the local economy (in this case the local economy in the Sandy Area) are called "basic" dollars and are the cause of economic change. Dollars spent by local hunters are not basic and should not be included in the impact estimate. This is a critical point -- if the dollars spent by local hunters have been included in the impact estimate then the recreation figure (on page 2-159) is incorrectly stated.

3. The definition of agricultural income as "net ranch income" is illogical in view of the definitions of recreation income and construction income on page 2-159. Recreation income and construction income are both defined in terms of gross flows, then any comparison between these and agriculture greatly understates the value of agriculture to the local economy. If the BLM wants to make comparisons for benefit/cost analysis, or whatever, then it would be wise to be logically consistent in measuring those things to be compared.

Generally, I feel that the economic impact and measurement portions of this document (the Sandy Area EIS) uses methodologies for analysis which are inappropriate and/or incorrect and then applies them, for the most part, in an illogical and inconsistent manner. It is my feeling that the BLM's entire approach to this type of economic impact analysis should be carefully reevaluated and the results of the Sandy Area EIS should not be implemented until this review is completed.

Eugene P. Lewis
State Leader
Community Development

EPL: IN

cc - Frary
Fletcher
Tuma

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June 23,1978

Bureau of Land Management
Rock Springs,Wyoming

Dear Sirs:

I have reviewed the Sandy Grazing Environment Statement and would commend the Bureau of Land Management on a job well done.Extensive time and energy must have been consumed.

My main concern and comments will be directed to the area above the checkerboard lands and including the Continental Peak,Red Desert,Bush Rim,Pacific Creek,Steamboat Mt. and Sands allotments.It is my feeling that there should be <u>no further fencing in</u> this area and that mineral development should be excluded.This for the followigg reasons:

1.The area is of tremendous historical value because of the Oregon Butte's,Trail, South Pass city,Sand dunes,Boar's Tusk,Steamboat Mt. and many other such areas.

2.With the encroachment of mining upon much of the rest of the Red Desert and endless road construction,one area of the Desert should be kept much as it has been in the past with prime concern for Historical values,wildlife and scenics.The entire area,I believe,would encompass only about a million acres. This would not exclude domestic grazing.

3.The fencing of this area into private grazing allotments will greatly decrease the mobility of wildlife,wild horses and even the recreationists.

4.This will be one of the last opportunities to keep a portion of the old Historic west in much the same condition it was when the pioneers crossed it.Some thing like this should be preserved for future generations.There are times when we must be concerned about more than just the material aspects of life.Such an area would do much for man's mental and spiritual up-lifting."Man does not live by bread alone."

5.I have also noticed that the horse herb has been cut about a hundred head below the first recommendation for this area.

Any other reactions which I have are of a minor nature and not really that important. Much success as you now go into the final stages of establiag a plan for the Sandy area.

Sincerely,

Rev.Floyd Schwieger
648 Shoshone
Lander,Wyoming 82520

6

Advisory Council on
<u>Historic Preservation</u>
1522 K Street N.W.
Washington, D.C. 20005

June 27, 1978

Mr. Dean F. Forsgren
Bureau of Land Management
Sandy ES Team Leader
P. O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Forsgren:

This is in response to Neil F. Morck's undated request for comments on the draft environmental statement (DES) for proposed livestock grazing management in the Sandy area of Southwestern Wyoming. We have reviewed the DES and note that the undertaking may effect numerous archeological properties that may be eligible for inclusion in the National Register of Historic Places.

Pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320) Federal agencies must prior to the approval of the expenditure of any Federal funds or prior to the granting of any license, permit, or other approval for an undertaking, afford the Council an opportunity to comment on the effect of the undertaking upon properties included in or eligible for inclusion in the National Register of Historic Places. A copy of the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800) is enclosed.

Until the requirements of Section 106 are met, the Council considers the DES incomplete in its treatment of historical, archeological, architectural and cultural resources. To remedy this deficiency, the Council will provide, in accordance with its Procedures, substantive comments on the effect of the undertaking on these properties. Please call Brit Allan Storey at (303) 234-4946, an FTS number, to assist you in completing this process.

Sincerely yours,

Louis S. Wall
Assistant Director, Office of
Review and Compliance, Denver

Enclosure

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

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1321 E. 22 St.
Cheyenne, WY 82001
27 June 78

Mr. Dean F. Forsgren
Bureau of Land Management
Sandy ES Team Leader
PO Box 1369
Rock Springs, WY 82901

Re: 1792 (412) MR01

Dear Sir:

I appreciate the opportunity to review the Sandy Environmental (Draft) Statement and to submit a brief written comment on the matter.

Eight of the nine objective set forth in the summary of the proposed management plan are above reproach. The notable and painful exception is the proposal to allow grazing qualification conversion from sheep to cattle and thus introducing a crucial change in the quality and character of the environment.

The adverse impacts such conversion would impose on open space, on wildlife, on soil and waters, on management costs and other public interests, are recognized in the ES so I need not reiterate them here.

Surely there must be some alternative for management of the public lands, between locking them up in wilderness on the one hand, and milking the last dollar out of them on the other hand, wherein the potential uses of the resource can be accommodated in a reasonable balance consistent with the public's interests and the BLM's "multiple use" concept.

When wildlife needs, open space values, recreational and environmental interests are compromised or sacrificed by allotting only "mitigating measures" to lessen the impact of accommodating some private objective, the multiple-use concept is raped by its own guardian. The feeble and often-futile attempts at "mitigating measures," i.e. more fences and more intensive management, become part of the problem rather than its solution.

I respectfully urge the Bureau to love and protect the great Sandy area as nature created it, one of the last open ranges of the American west, and to manage these two million acres consistent with the multiple-use concept and for the following specific purposes:

(1) to decrease soil erosion and increase stream channel stability to improve wildlife and fish habitat.
(2) to protect, enhance, and enlarge the vegetative resource.
(3) to provide adequate range and forage for the desired populations of wildlife and wild horses.
(4) to continue the present plan of grazing allotments to the extent that such allotments are consistent with (1) and (2) above.
(5) to minimize further fencing or encroachments on the open range which interfere with wildlife movements and recreational uses.

John J. Hayes
President, Wyoming Division
Izaak Walton League of America

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THE UNIVERSITY OF WYOMING
WATER RESOURCES RESEARCH INSTITUTE
P. O. BOX 3067, UNIVERSITY STATION
LARAMIE, WYOMING 82071

PAUL RECHARD
DIRECTOR

TELEPHONE 766-2143
AREA CODE 307

June 27, 1978

Mr. Dean F. Forsgren
Bureau of Land Management
Sandy ES Team Leader
P. O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Forsgren:

Dr. Gordon Kearl asked me to review portions of the Sandy Grazing Environmental Statement (Draft) and to give him my comments. I discussed the socioeconomic section of the report with Dr. Kearl. Since he plans to present an oral statement, you will receive an indication of the concerns I have with the report in his statement. As a matter of emphasis, I decided to send a written statement pointing out what I consider to be some serious methodological problems in the report.

I'm a resource economist at the University of Wyoming and for the past 10 years I have worked nearly fulltime in the area of recreation and wildlife economics. I am a strong advocate of the use of the state's natural resource base for recreation and tourist activities and I generally welcome any analysis that compares the economic benefits derived from using the state's resource base in support of recreation and tourism with other economic uses. In the case of the draft Sandy report, the economic advantage of the recreation options appear to be grossly out of balance with the livestock or ranching options. A review of the analytical procedurea described in the draft report causes me to question the appropriateness of some procedures. In particular, I have concerns with the following procedural steps.

1) Treatment of all recreation activity as though this activity generated regional income.

2) Determination of the value of Sandy area AUM's.

3) Definition of the region for purposes of estimating regional economic impacts.

<u>Treatment of all recreation as though this activity generated regional income</u>: It appears that no distinction was made between the recreation activity attributable to local residents of the Sandy area and that activity attributable to non-local recreationists and tourists. Only those recreation days attributable to non-local recreationists and tourists should be considered to

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generate regional income. In general, the expenditures of non-local recreation and tourist groups represent new regional income. Recreation expenditures by locals is part of the spending cycle that generates the multiplier effect. Including the recreation expenditures of local residents as an expenditure impact results in a double counting of some other source of regional income. In other words, recreation expenditures by non-local recreationists represent a source of new regional income whereas recreation expenditures by local residents reflect only the choice residents make in spending incomes already earned.

I do not have access to BLM Washington Office Instruction Memorandum 76-455 which is cited in Appendix 3E (page A-63) of the Sandy report as outlining the procedure to be followed in calculating "recreation values". Therefore, I am not aware of the specific procedure outlined in this memorandum for the treatment of local expenditures in estimating regional benefits. I am familiar with benefit/cost analysis and I feel confident that the apparent failure to distinguish between local and non-local recreation expenditures is not consistent with the benefit/cost procedures adopted by other federal agencies.

Determination of the value of Sandy area AUMs: Considering the relative importance of the livestock options expressed in the six alternatives, it is disconcerting to realize the degree of arbitrariness associated with the $2.85 figure that is supposed to represent the value of a Sandy area AUM. Although reference is made elsewhere in the report to a 1974 article that appears in the May 1974 Journal of Range Management entitled, "Livestock Grazing on Federal Lands in the 11 Western States," there is no attempt to reconcile, dispute or reject the $7.00 to $10.00 values per AUM cited in this article. While the authors of the Journal article were limited to secondary data, as was the case for the Sandy report, their methodology displays a reasoned and practical logic and is documented with numerous research reports.

The Journal article lists a production estimate per AUM for cattle and calves in Wyoming at 29.3 lbs. Twelve AUMs would yield 351 lbs of beef at this rate. This figure is close to the average weight of a feeder calf at the time of sale. It is probably a fairly close estimate of the pounds of beef produced in a year after taking into account, 1) the number of bulls and replacement cows in a typical range operation that would not go to market, and 2) that the gain on yearling cattle may be somewhat higher than total calf weights. To derive an estimate of value, the average production per AUM was multiplied by 38 cents per pound (29.3 lbs x .38 = $11.13 per AUM).

If the value of an AUM in the Sandy area is only worth $2.85 and we assume the price of beef to be 38 cents/lb, it appears that a Sandy AUM would only be producing 7.5 lbs of beef. On an annual basis, the Sandy range would only be producing 90 lbs of beef (a 90 lb calf?). On the surface, this report would suggest that a Sandy AUM of range feed was not as productive as an AUM of range feed elsewhere in the state. Assuming the data was correct that was used to calculate the $2.85 figure, two possibilities come to mind that could explain the discrepancy in value of an AUM between the Sandy report and the Journal article. First, if ranchers were building their livestock inventories during 1970, the total livestock earnings figure used in calculating the $2.85 value

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(page 2-144) would understate the true value of livestock produced in the area. Second, if some of the allotments were not being grazed during 1970, then production of beef (and/or sheep) would be below the capacity of the area. By basing the value of the AUMs on current production (less inventory increases) is to assign a zero value to those allotments not being utilized, an erroneous application of economic logic.

In short, the evidence appears overwhelming that the $2.85 value per AUM adopted in the Sandy report results in a substantial and obvious bias against the livestock options.

Definition of the region for purposes of estimating regional economic impacts: There are several cases in the report where inconsistencies exist in the definition of the region used to assess regional impacts. Moreover, it is not clear why, at times, the region of economic influence was limited to the boundaries of the Sandy area. Practically all ranch business would have to be transacted outside the Sandy area. This definition of the region justifies the low multiplier (1.37) but it also eliminates major impacts that would stem from a change in the current use pattern of the area's resources. The businessman that serves the areas ranchers will be affected by a change in resource use just as the ranchers will be impacted.

My major concern with delineation of the region is the inconsistency in application. In the case of livestock the procedure for determining the impact is to multiply this increase or decrease in AUMs by the value per AUM ($2.85) and then multiply the resulting product by the multiplier. This procedure restricts the analysis to those economic benefits generated strictly within the Sandy area boundaries. To the extent that the $2.85 figure is an understatement of the true value of an AUM, this procedure is overly restrictive. To be consistent, the recreation value per day should be reduced to represent only those expenditures that actually occur within the boundary area. It is obvious, irrespective of the activity, that most spending transactions (food, lodging, gasoline, equipment, etc.) associated with the various recreation activities in the area would occur in cities and towns outside the Sandy area. There are simply not enough opportunities within the Sandy area for non-local recreationists and tourists to purchase the goods and services they require to participate in one of the area's recreation activities even if the recreationist was so inclined. To attribute, for example, the $75 per day expenditure for antelope hunting to the Sandy area does not make sense considering the extent and level of services available. Based on the experience I have had in conducting expenditure surveys for the Wyoming Game and Fish Department, I'd be surprised if more than $10 of the $75 daily figure were to be spent within the area. To not make an adjustment of this type would again lead to a substantial and unjustified bias favoring the recreation options.

Let me again state in closing that I feel somewhat uncomfortable in criticizing a report for overstating the benefits the state derives from recreation and tourist activities. In my judgement, however, the Sandy report is so biased

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in favor of recreation that it stands to discredit the real economic benefits associated with these sectors. I'm sending copies of this letter to Dr. Glen Fulcher, Denver Service Center and Dr. Roy Allen in the State Office to call their attention to these problems as it appears they may be procedural rather than mechanical. If so, I would think BLM would want to review its guidelines for conducting economic analyses. If the concerns I have expressed are not clear or if I can be of assistance in resolving some of the problems, please feel free to contact me at the University.

Sincerely,

Clynn Phillips

Clynn Phillips, Ph.D.
Associate Director and
Professor of Water Resources
(Economics)

CP:ml

cc: Dr. Glen Fulcher
Dr. Roy Allen

9a

THE UNIVERSITY OF WYOMING
College of Agriculture and Experiment Station
Agricultural Building, Laramie, Wyoming

DIVISION OF AGRICULTURAL ECONOMICS

Mail Address:
Box 3354, University Station
Laramie, Wyoming 82071

June 30, 1978

Dean F. Forsgren
Team Leader
Bureau of Land Management
Sandy Environmental Statement
P.O. Box 1869
Rock Springs, WY 82901

Dear Mr. Forsgren:

I am submitting this letter and the attached letter from E. Bruce Godfrey, Associate Professor of Economics at Utah State University, to Mr. Edward R. Frandsen, Bureau of Land Management, Denver Federal Center. I would like this letter and the attachment to be considered as a written statement on the Sandy Grazing Environmental Statement.

Sincerely yours,

W. Gordon Kearl

W. Gordon Kearl
Professor

WGK:csw

Enclosure

UTAH STATE UNIVERSITY • LOGAN, UTAH 84322

DEPARTMENT OF ECONOMICS AND BUSINESS

COLLEGE OF AGRICULTURE
COLLEGE OF BUSINESS

June 26, 1978

Mr. Edward R. Fransdon
Bureau of Land Management
Sidney Federal Center
Sidney, MT 59270

Dear Ed:

Some of the concerns I expressed in my letter of 13 June were brought clearly to mind when I reviewed the sections of the Sandy EIS (Wyoming) which Gordon Knarl recently sent to me. The recreation values used in the Sandy EIS represent estimated willingness to pay. They do not represent

a. The expenditures made by recreationists in the area as computed by the EIS writers.
b. The income attributable to recreation in the local economy
c. The value per recreation day or
d. the value of the animals involved.

Therefore, the method suggested by the recreation committee ought to also include a discussion of what these values represent and how [when] they might be used. The numbers are nice, but what do they indicate or represent?

Sincerely,

L. Bruce Godfrey
Associate Professor

BGG:kl

CC: Gordon Knarl

STATEMENT ABOUT
SANDY GRAZING ENVIRONMENTAL STATEMENT DRAFT[1]

by

W. Gordon Knarl
Professor of Agricultural Economics
University of Wyoming, Laramie, Wyoming

My name is Willis Gordon Knarl. I am Professor of Agricultural Economics at the University of Wyoming. Because of my job at the University of Wyoming and my assignment on an Old West Regional Commission Project, I have reviewed the Sandy Grazing Environmental Statement. I wish to make it clear that I am not officially representing the University or any group or organization.

The draft statement is typed in small type and closely single spaced lines. By actual count there are 615 pages, which are equivalent to 1,025 standard single-spaced type-written pages, and an additional 34 fold-out pages of maps. I received a copy on June 2, which I believe is earlier than most other people received copies. That scarcely gives time for careful review and intelligent responses. I suggest that in view of the length, comprehensiveness, and complexity of this document an additional 30 day time period for accepting written comments is warranted.

When reviewing this document I became quite alarmed at the data used, the terminology used in treatment of the data, results, and conclusions reached regarding some recreational and socio-economics aspects. Referring to Chapter 2, page 145 there is an indication of use of 1975 census of

1/ Presented at hearings, Rock Springs, Wyoming, June 28, 1978.

THE UNIVERSITY OF WYOMING
College of Agriculture and Experiment Station
Agricultural Building, Laramie, Wyoming

DIVISION OF AGRICULTURAL ECONOMICS

Mail Address:
Box 3354, University Station
Laramie, Wyoming 82072

July 13, 1978

Mr. Dean P. Forsgren, Team Leader
Bureau of Land Management
Sandy Environmental Statement
P.O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Forsgren:

I am enclosing a copy of the testimony that I gave at the Sandy EIS hearings June 28th. In discussions with Larry Bourret I was told that the court reporter's transcript was pretty well garbled. I had expected they would use the written statement as submitted in the transcript but perhaps that was not so. I am not sure whether the written statement was submitted to you or is still part of the court reporter's file.

If the written statement turned in to the court reporter is not included in the hearing record exactly as it was prepared then I wish to submit this letter and the attached statement as an additional statement.

Sincerely yours,

W. Gordon Knarl
Professor

WGK:kle
Enclosure

Page 2

Agriculture data to estimate that 11 ranch accounted for 83% of regional agricultural sales. All livestock prices were unusually low and hay and some other crop prices were unusually high in 1974. Obviously the percentage of regional agricultural sales attributed to livestock are distorted in 1974, and the true percentage over a period of time is probably 90% or more for this area.

On Chapter 2, page 144 there is a statement, "the percentage of total regional income derived from ranches using Sandy Area resources are estimated to be approximately 5.4% of 1972 regional agricultural income and less than 12 of total regional income. (These computations account only for rancher income, hired labor was not included in the calculations)". This strongly implies ranchers net income is the only item included. The contribution to regional income from ranchers expenditures for purchase of vehicles, machinery, repairs, feed, supplies, in addition to hired labor and any other production expenses are also not included, or considered for their effect on total regional income derived from ranches.

Table 2-71 on page 2-145 shows farm earnings in 1972 at $21.4 million for the region, or $16.4 million for the three-county Area, excluding Sublette. Further, on Chapter 2, page 144 there is an indication that total livestock earnings for these three counties in 1970 were about $5.4 million dollars. Calculations used and sources of data are not clear and perhaps not complete. Cattle prices increased about 25% and sheep, lambs, and wool prices increased less than 10% between 1970 and 1972. Costs also increased. In conclusion, it is very difficult to reconcile the $16.4 million in Table 2-71 and the $5.4 million on page 2-144.

Some further calculations are made on the approximately $5.4 million to arrive at $2.85 per/AUM, as an indication of the value of grazing. This is not a return to land, and should not be construed as indicating directly the ability to pay grazing fees.

That $2.63/AUM in used subsequently on pages 118-119 of Chapter 3 with a multiplier of 1.387 and AUM's of use to estimate "a positive income impact, (which) would be relatively insignificant on a regional basis." The same numbers, and similar uses and interpretations are applied in Chapter 8 on pages 8-29, 8-44, 8-72, 8-100, and perhaps elsewhere in portions of the report which I have not had time to study carefully.

The economic value and contribution of federal grazing lands to the economies of the Western States have been reviewed by a Council of Agricultural Sciences and Technology (CAST) Task Force. Ehardy, Harold F., et al. "Livestock Grazing on Federal Lands in the 11 Western States," Journal of Range Management, Vol. 27, No. 3. May 1974, p. 174-181). The value of production in 1972 was estimated at $10 per AUM for cattle and $7.00 per AUM for sheep, excluding government payments for wool. At present price levels these values are probably about $12-$13 per AUM. These are gross receipts, and again do not reflect directly the ability to pay grazing fees.

Agriculture is a basic industry. Gross receipts from the sale of livestock represents new money brought into the local economy, and respent several times within the community. The multiplier effect of new money at the local level was estimated conservatively at 2.25 in the CAST report. Regional economists at the University of Wyoming who have made studies in Wyoming suggest a minimum multiplier of 1.8 X gross receipts to reflect the impact of agriculture for this southwest Wyoming area.

Using the CAST Task Force approach and value of $10 to 12 dollars/AUM with a multiplier of 2.25 the value would be put at $22.50 to $27.00, compared with $3.95/AUM derived from the Sandy Grazing Environmental Statement. The difference is 500% to 600%. Hardly a minor discrepancy. The data presented in Table 2-71 on page 2 - 145 of the Sandy Grazing

of a multiplier, and then describe the result as income to the area, or an increase in income. I would expect most of the recreation use in the Sandy Grazing Area to be residents of the four-county area.

Expenditures by non-residents, or non-locals if you prefer, can be considered basic income or new income in the economy provided the expenditures are made in the area or region under consideration. Much of the non-resident expenditure included in determining value per visitor day is the prorated expenditure associated with purchase of vehicles, or boating, fishing, or camping equipment, fuel and supplies. Most of these expenditures are made in the area where the non-resident or non-local recreationist resides, for instance, Utah or Colorado.

The recreational expenditure perhaps indicates the value to the individual recreationist. However, the expenditure must be adjusted to reflect only the expenditures made within the region by the non-resident or non-local recreationist before calculating impact or value to the economy. I have no basis for estimating the contribution to the economy from recreational uses of the Sandy Area. I would venture the opinion that it is perhaps only about 10% of the value mentioned on page 119 of Chapter 3. I must conclude that the value of recreational uses to the economy is over-estimated considerably while the value to the economy has been underestimated by several hundred percent for grazing, resulting in a very fallacious comparison.

On page 131, Chapter 2 there is an indication that 89% of the visitor use of the Sandy Area is related to water features or water related settings and habitats representing less than 11% of the area. Other relatively high density recreational use areas probably account for much of the other 11% of recreational use. That fact should be noted and emphasized. As a further point, there is a statement, "most of the Sandy

Environmental Statement will come much closer to supporting the estimate made by CAST than to supporting the estimate that is developed on page 2-144 of the Statement and used repeatedly at subsequent points through the balance of the Statement.

Turning now to the value of recreational uses, I want to say that I enjoy hunting, fishing, sightseeing, and other recreational uses of public land. I recognize the value that public lands have for recreational purposes. Expenditures for recreation give a rather crude measure of the value. The recreational value associated with public lands in the Sandy Area I believe have been over-estimated through the improper use of data and improper interpretation of results.

If recreational uses were assigned a value in Chapter 2, I did not detect it in my limited time available for review of that chapter. However, recreational values are defined and discussed in Chapter 3. On page 3-119 there is a statement, "the annual increase in income that results from those impacts can be determined by multiplying the changes in each category of activity by the daily values associated with those activities as shown in Appendix J. As shown on Table 3-64 there would be an annual increase in income because of recreation impacts amounting to $843,205.37. The total income effect would be $843,205.37 x 1.387 = $1,169,527,85." I won't question the value per visitor day shown on page J-120. Glynn Phillips at the University of Wyoming has made a career of doing research on outdoor recreation, including work for the Wyoming Game & Fish Commission and for the Park Service. Perhaps it would be advisable to contact Dr. Phillips about these values, and about some other matters which I do question.

Expenditures by area resident recreationists are consumption expenditures, not basic income like that produced by agriculture. I do not believe it is appropriate to take all of the value of these expenditures, process by use

And is used very little for recreation, however, hunting, collecting, recreational vehicle use, and sightseeing do occur throughout the area. Average density of use is very low amounting to a little more than 0.37 visitor days per acre per year".

If time permits, and depending on whether an extension of time for written responses is granted, I will attempt to submit an additional written statement in greater detail.

Thank you.

July 14, 1978

Mr. Donn F. Forsgren
Team Leader
Bureau of Land Management
P.O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Forsgren:

I am enclosing an additional written statement in relation to the Sandy ES. Fortunately it is Friday afternoon. Anything I send must be in the mail today. Consequently, you will not receive any further statement from me.

Sincerely yours,

W. Gordon Kearl

WGK:kle
Enclosure

annually and unused of about 58,000 AUM's annually. It is conceivable that through a management program to activate much of the nonuse the relatively favorable cost-benefit ratios could be achieved. Whether that was a factor is not clear.

Page 1 - 22.

Information on this page, together with information on other parts of the ES, indicate projected annual maintenance costs of the proposed range improvements at $91,210 for the permittees and $18,490 by the BLM for a total of $109,700.

Page 1 - 23.

Total investment requirement for the range improvements is estimated at $2,860,100. Of the total, $1,354,000 is for fences and cattle guards and $975,000 is for wells. The total for these types of development accounts for $2,329,000 of the total $2,860,100. Useful life for the fences is estimated at 20 years and for the wells at 40 years. Useful life of a few other range improvements varies from 12 to 40 years. Given maintenance costs mentioned above, and amortization of this large an investment, the benefit-cost ratios certainly look questionable.

Page 2 - 131, Column 1, Paragraph 6.

There is an indication that most of the recreation use takes place at Fontenelle Reservoir and Big Sandy Reservoir and along the Big Sandy River and Little Sandy Creek. The South Pass area, the Sweetwater River, and many creeks are mentioned. There is an indication that 67% of the visitor use in the Sandy area is related to water features and water related settings and habitats representing less than 11% of the area. An estimated 99,372 visitor days per year are spent in these areas.

Comment: It would be desirable to separate out the use of a Fontenelle Reservoir and Big Sandy Reservoir. It seems that much of the recreational use

on these reservoirs can be carried out with minimum conflict with grazing by either livestock or wildlife. This point should be emphasized.

Page 2 - 131, Column 2, Paragraph 5.

There is mention of "highest density use in the Sandy area occurs within a small area near Scar's Tank where a mud dune recreation vehicle rally is held each year. This use apparently occurs only one weekend out of the year.

Comment: Again, there seems to be minimum conflict between a one weekend recreational use and grazing that is spread through the year.

Page 2 - 131, Column 2, Paragraphs 8 & 9.

"Most of the Sandy area is used very little for recreation."

"The lack of use in these areas is a recreation value in itself. Comment at public meetings has implied concern for wide, open spaces, especially those of the Red Desert."

Comment: Perhaps, but how can this recreation value due to non-recreation use be measured or valued? How much is it affected by the presence of grazing animals?

Page 2 - 133.

General Comment: How are visitor days measured and defined? Does any small part of a day constitute a visitor day? Is it possible, for instance, for two people in a vehicle to pass through several different allotments on the same day and have recorded visitor days of use in each of the allotments? In short, when calculating total visitor days by activity, is there quite a lot of double counting? This could easily be a problem with activities such as sightseeing, recreation vehicle use, perhaps big or small game hunting, collecting, and perhaps even stream fishing or float hunting.

Page 2 - 144, bottom of Column 1 and most of Column 2.

Comment: Livestock operations role in regional income is based on one or more assumptions which are probably erroneous. Based on the 1974 Census of

Written Statement to Supplement the Written and Oral Statements presented by W. Gordon Kearl about the "Sandy Grazing Environmental Statement Draft" at hearings held in Rock Springs, Wyoming, June 28, 1978.

This statement is addressed primarily to the recreation resources and values and to the socioeconomic characteristics discussed in the ES. The following material will reference specific page numbers, columns, and paragraphs from the ES and perhaps give quotations from that source in order to clarify the context of the comment.

Page 1 - 10.

Results of benefit-cost analysis of allotments is duly noted. There is an indication that the benefit-cost ratio is in the range of 1.0 to 2.0 on 8 allotments and better than 2.1 on 8 allotments. No allotment shows a benefit-cost ratio of less than 1.0. There is no supporting information or data pertaining to benefit-cost analysis, and no indication how the benefit-cost analysis was performed. Recent work does not give credence to such optimism. (Workman, John P. and Muhammad Nasir. "An Analysis of Bureau of Land Management Grazing Systems in the Intermountain Area". Unpublished paper. Department of Range Sciences, Utah State University, 1977; see also a thesis by Muhammad Nasir, "An Analysis of Bureau of Land Management Grazing Systems in the Intermountain Area", Department of Range Sciences, Utah State University; Ching, C. T. K. and Charles E. Hancock. "The Economic Feasibility of Rest Rotation Grazing - A Case Study", MS43, College of Agriculture, University of Nevada, 1973.)

Page 1 - 2.

There is an indication of 1972-73 average actual use of about 80,000 AUM's

Agriculture. 83% of regional agricultural sales are attributed to livestock in the ES. Also, there is an indication that 14% of regional income is from agriculture, based on 1972 data. Prices of agricultural products vary quite extremely from year-to-year, or over relatively short spans of time. Income in other parts of the region's economy also vary. However, that variation is more due to a steady upward trend and is probably not great on a year-to-year basis.

Because of the variations in year-to-year agricultural prices, selection of years in making comparisons is a matter of real concern. Prices for beef cattle and calves, sheep and lambs and wool were at very low levels in 1976. All hay, wheat and barley which are the principal non-livestock products sold from the region were at unusually high levels in 1976. Under more normal price relationships livestock would account for considerably more than 83% of the regional agricultural sales.

Beef cattle, which includes cull cows and bulls and yearling steers and heifers, accounts for the bulk of cattle sales. In 1972 those prices were somewhat below the recent average. Prices of sheep, lambs and wool, which account for much of the agricultural production and sales from the Sandy area, were much below average in 1972. Cattle and sheep, lambs and wool prices were all far below present price levels or intermediate term (5 to 7 years) outlook prices.

The use of erroneous percentage of agricultural income from grazing together with years when prices were relatively low results in a serious understatement of the economic contribution of grazing.

Page 2 - 144, Column 2.

Some additional calculations made are not clear. From the ES: "on these totals, average net income per ranch figures from published data (Stevens, 1971; Gee, 1975) were multiplied. The result and figures were then reduced using

consumer price index data to reflect 1972 figures (Council of Economic Advisers, 1975). The general calculations were as follows:

19 sheep operators x $53,551 per ranch net income = $1,017,469; etc."

Comment: It is not at all clear why "the result and figures were then reduced using consumer price index data to reflect 1972 figures." The Stevens publication which was cited reported on sheep ranching income for 1960, 1964 and 1968. Certainly those figures should not have been reduced from 1960, 1964 or 1968 levels to 1972 levels by using consumer price index data.

The Gee study referenced is listed as unpublished. It is probably the study which has since been published (Gee, C. Kerry. "Enterprise Budgets for Western Commercial Sheep Businesses, 1974". ERS-659. Economic Research Service, U.S. Department of Agriculture, March 1977). This study does not treat the southwestern Wyoming area of the United States separately. It does treat a mountain area which includes western Montana, northern and eastern Idaho, much of western Wyoming and eastern Utah, western Colorado and northwestern New Mexico. This study presents data for different sized operations and different resource bases. The study used 1974 prices of sheep, lambs and wool. Those prices were slightly higher than 1972, considerably less than the 1972-78 average, and much less than current prices as mentioned previously.

It is impossible to determine what parts of the data from Stevens and Gee's publications were used, or how the data on page 2 - 144 were developed.

Certainly the use of consumer price index data for making adjustments to either gross receipts or net returns in agriculture is highly suspect. There is probably only a remote connection between consumer price index and agricultural prices or net returns. Certainly consumer price indexes would not reflect year-to-year variations or variations within a short span of years. It could only have any correlation with agricultural receipts or net incomes if the correlations were over a very long period of time, picking up the long-term time trends.

Adjustments by use of farm commodity prices or indices of prices paid or received would be much more logical.

The subject of using net ranch income data instead of gross receipts was addressed in the statement submitted as both oral and written at hearings in Rock Springs, June 28, 1978. It was also addressed to some extent in statements submitted by Dr. Glynn O. Phillips and by Eugene P. Lewis, both of the University of Wyoming. It is not necessary to make further mention of these arguments, except to point out that an error exists.

Page 2 - 144, Column 2, Paragraph 4.

From the ES: "total contribution of Sandy AUM's to 1972 income as calculated above equals $409,582; $409,582 divided by $1,150,471 = 36%. Therefore Sandy area AUM's account for approximately 36% of net income of Sandy area licensees.

Comment: The arithmetic is correct, but perhaps the logic is faulty. Where a number of different kinds of resources are used in a production process the contributions of each to net income will not necessarily be in direct proportion to the amounts of each resource used. Especially when there are small changes in availability of resources, the effects on gross incomes will likely be more than proportional to the change. The effect on net income can be much more than proportional. This comment is more relevant to some other portions of the ES and will perhaps be developed further at a subsequent point.

Page 2 - 144, Page 2 - 145.

Inconsistencies between data presented in Table 2-71 on page 2-145 and data used in the narrative on 2-144 were mentioned in the oral and written statements submitted at hearings June 28, 1978. They are mentioned again in this statement solely for emphasis.

Page 2 - 161.

Agricultural employment in this table is not included as "basic employ-

ment", but is listed with service employment. That is clearly an error.

Page 2 - 163.

Agriculture is identified as a "basic industry" here. Correct! But not consistent with page 1-161.

Page 3 - 114, Column 1, Paragraph 4.

Comment: Restoration of AUM's from non-use to full use category may be the principal advantage of adoption of the proposal. Even that may not be sufficient to offset other problems.

Page 3 - 114, Column 1, Paragraph 5.

From the ES: "the proposed grazing systems should result in improved range conditions, increased vigor of the preferred forage species, and increased forage production, which should result in improved livestock condition and production. Over the short term, livestock condition and production should improve as the range improves and cattle adjust to the new grazing practices. Improved range conditions should also result in increased weight of calves and lambs at the end of the grazing season. Quantification can not be predicted until better data is gathered, which would have to be supplied by the permittees."

Comment: The word "should" appears four times in the above quotation. It would seem that the Bureau of Land Management would have a compilation of research results to support more definitive statements about the potential consequences before embarking on allotment management plans and programs which involved such a large investment and such high risk. If there is a comprehensive compilation of research it is not referenced.

There were two extensive reviews of grazing systems (Herbel, Carlton H., 1974. "A Review of Research Related to Development of Grazing Systems on Native Ranges of the Western United States." PLANT MORPHOGENESIS AS THE BASIS FOR SCIENTIFIC MANAGEMENT OF RANGE RESOURCES - Proceedings of the Workshop of the United States-Australia Rangelands Panel, Berkeley, California, March 29 -

April 5, 1971. Miscellaneous Publication No. 1271, Agricultural Research Service, United States Department of Agriculture; Herbel, Carlton H., 1971. "A Review of Research Related to Development of Grazing Systems on Native Ranges of the Western United States." Jornada Experimental Range Report No. 3, Plant Science Research Division, Agricultural Research Service, U.S. Department of Agriculture, in cooperation with Agricultural Experiment Station, New Mexico State University, November 1971). The first article mentioned reviewed and cited 37 publications. The second article mentioned reviewed and cited 52 publications. The two articles were probably written in 1973 and 1971. There has been much additional work done since that time.

The Sandy ES does not reference either of Herbel's papers. Only three of the references cited by Herbel are found in the listing of literature cited in the Sandy ES. An additional two authors cited by Herbel are cited in the Sandy ES, but for different work than cited by Herbel. In view of the fact that Herbel's papers were wide ranging surveys of literature it seems strange that there was not more overlap of literature cited. It seems strange that there was not more reliance on scientific work reviewed by Herbel in preparation of allotment management plans and subsequently used in the Sandy ES to support the BLM case.

Review of the literature cited in the Sandy ES indicates about 11 references that might be considered to relate to grazing systems or rest rotation systems. The content of those references and just how they have been used to support application of grazing systems to the Sandy area is not clear. The wording on page 3-114 certainly does not inspire confidence.

Perhaps there is reason to question the assumption that improved range conditions, increased vigor of preferred forage species, and increased forage production should result in improved livestock condition and production. The connection between range condition and livestock condition is apparently quite

tenuous (Williams, Lincoln. "Condition of Livestock in Relation to Range Conditions", and, Smith, Arthur D. "Gain Made by Livestock: A Poor Barometer of Range Condition". Both articles in Rangeman's Journal, Volume 5, No. 1, February 1978).

There is not sufficient time for an intensive review of the literature on grazing systems to obtain information on livestock performance under such systems. Even if time did permit such intensive review it is questionable whether very much information would be available on performance of livestock. Indeed, it appears as if the range science profession and the land managing agencies have perhaps gone to some length to avoid making measurements on animal performance on grazing systems, or reporting such measurements in their literature.

The relationship between livestock gains and production and intensity of grazing has been well demonstrated (Houston, Walter R. and R. R. Woodward. 1968. "Effects of Stocking Rates on Range Vegetation and Beef Cattle Production in the Northern Great Plains", U.S. Department of Agriculture, Technical Bulletin 1357; Woolfolk, E. K. and Bradford Knapp, Jr. 1949. "Weight and Gain of Range Calves as Effected by Rate of Stocking", Montana Agricultural Experiment Station Bulletin No. 483; Lewis, James K., George N. Van Dyne, Leslie R. Albee and Frank Whetzel. 1956. "Intensity of Grazing - Its Effect on Livestock and Forage Production", South Dakota Agricultural Experiment Station Bulletin No. 459; Klipple, G. E. and David F. Costello. 1960. "Vegetation and Cattle Responses to Different Intensities of Grazing on Short Grass Ranges on the Central Great Plains", Technical Bulletin No. 1216, U.S. Department of Agriculture; Smith, D. R., H. C. Fisser, N. Jefferies, and P. O. Scratton. 1967. "Rotation Grazing on Wyoming's Big Horn Mountains", Wyoming Agricultural Experiment Station Research Journal 13; and probably many other references). The general thrust of the literature referenced indicates a 5 to 10 percent reduction in calf gains

and percent calf-crop in moving from a moderate, such as 40%, to a heavy rate, such as 60%, of utilization. A reduction in yearling gains, and in mature weights and gains of cows is somewhat larger, perhaps on the order of 10 to 20%.

One of the rest rotation grazing system implies, and indeed requires high intensities of grazing and large percentages of utilization on the pastures which are in use. One can certainly hypothesize an effect similar to that noted in studies on effects of intensities of grazing.

The land managing agencies, to my knowledge, have not documented elsewhere the performance of grazing systems to give reason for optimism about the effect on livestock. Certainly it is not documented in the Sandy Grazing ES. The effect on sheep is conjectural and doubts fully as warranted as on cattle.

Unfortunately, the land managing agencies and the range management profession apparently have not encouraged economic evaluations of grazing systems.

Page 3 - 114, Column 2, Paragraph 2.

From the Sandy ES: "since cattle would be confined to ¼ to ½ of the area within an allotment they would normally use, there should be an increase in the probability of a cow being bred. Cattle would be confined in one pasture for at least one heat period (every 21 days). A mixture of last years forage and green forage should allow cattle to adjust to their new diets and reduce the incidence of scours and initial weight loss (Gossard and Juergenson, 1971)."

Comment: The above statement could be accepted as true, providing that the nutrition of the animal is adequate to allow the cows to return in estrus in a relatively short period of time after calving. Concentrating cows into a relatively small area will not increase their probability of being bred unless they are in estrus. Again, research has indicated that high intensities of grazing can have detrimental effects on percent calf-crop.

The nutritional value of year-old dry grass of the types found in the Sandy area is probably very low. Even mixed with green grass the nutritional content of the ration is likely to be low. A combination of a lower nutritional value of the feed ingested, which is likely, with high intensities of grazing and perhaps limited feed availability could touch off a chain reaction of undesirable consequences. It could reduce the number of cows in estrus within 50, 70 or 90 days after calving, reduce the percentage calf-crop, lengthen the calving period for those cows which do calve, and in turn, reduce the average calf age at weaning time and the average calf weight.

Again, the results hypothesized in the Sandy ES are quite conjectural, and perhaps questionable. Alternative hypotheses about the livestock performance may be more realistic and more easily supported by research than the results hypothesized in the Sandy ES. Effects on livestock performance are a matter of major concern to the livestock producer.

Lambing operations, weight gains, and breeding performance on sheep ranches are also conjectural and may be affected quite severely.

Page 3 - 114, bottom of Column 1 and top of Column 2.

From the ES: "Quantification cannot be predicted until better data is gathered, which would have to be supplied by the permittees."

Comment: Perhaps the permittees would be well advised to begin now to keep both physical (biological) and financial records in very good detail. Records of recent past performance might also be summarized to provide a multi-year data base. Comparisons could then be made with performance under AMP's.

Page 3 - 116, Column 1, Paragraph 5 & Column 2, Paragraphs 1 & 2.

There is mention here of a 15-day delay in entry to the Little Sandy-Little Prospect, Pacific Creek, White Acorn, and Prospect Mountain allotments. Adverse impacts on the operators are mentioned, and include the possible re-

quirements for purchasing additional feed for feeding the additional 15-days, or possible reduction in hay production due to requirement to graze farm fields and hay meadows an additional 15 days. There is also mention of possible 15-day additional use on the checkerboard, and possible 5, 10 or 15 day delay in commencing lambing, with consequent lighter weaning weights of lambs.

Impacts are recognized, but not evaluated from an economic point of view. It should be noted that a 15-day delay in entry in grazing where the season of use extends perhaps 150 to 200 days for some permittees represents about a 10% delay. The effect on net returns would likely be much more than a 10% reduction in net return.

Evaluations might be aided by use of budgeting procedures but time allowed for comment is not sufficient to allow that work.

Page 3 - 119, Column 1, Paragraphs 1, 2 & 3.

Comment: Again, net income instead of gross income is used along with an incorrect multiplier and the economic impact of the proposal on livestock grazing is understated.

Page 3 - 119, Column 1, Paragraph 3.

Comment: Again, the value and the impact of recreation on the local economy is overstated by use of the multiplier with the expenditures, which are not basic income.

Page 3 - 120.

The values per visitor day for various recreational activities are suspect. As is the use of the data and the interpretation. Was there any reference to Glynn Phillips work? (Phillips, Glynn and Sheryl E. Ferguson. 1977. "Hunting and Fishing Expenditure Values and Participation Preferences in Wyoming, 1975", Water Resources Research Institute, University of Wyoming).

How do values used for Wyoming compare with values used for other states?

How do you justify or reconcile the differences?

Page 5 - 4, Column 2.

Here there is recognition that the grazing systems proposed would cause livestock weight losses on treatment B, D and E. Reduction of animal gains by 10% could, as a minimum, result in a reduction in sales and gross receipts by 10%. Some of the costs of operation are likely to be increased and very few costs, if any, would be reduced. The reduction in net returns would likely be much more than 10%. If the reduction in gains resulted in some reduction in reproductive efficiency then there would be a compounding effect of reduced numbers for sale and reduced weight for sale. That could reduce gross receipts by considerably more than just the percentage reduction in gains or weights. Dire consequences could result for individual ranch operators.

Page 8 - 29, Column 1, Paragraph 5.

Again, there is the understatement of economic impact, due to the misuse of economic data.

Page 8 - 44, Column 2, Paragraphs 5 & 6.

Comment: Again there is the understatement of the impact in connection with livestock grazing. There is also mention of the "recreation income" which is said to increase. It is not income for the most part. It is merely a consumption expenditure. These types of errors are repeated through the following pages: Page 8 - 72, Column 2, Paragraphs 4 & 5.

Page 8 - 106, Column 2, Paragraphs 6 & 7.

Page 8 - 133, Column 2, Paragraph 2.

General Comments

I am not familiar with legal requirements for material to be included in grazing ES or for the format to be followed. In reviewing this ES I am impressed that perhaps some past history of grazing in the area should have

been provided. Also, perhaps some comparison of conditions at the time of original passage of the Taylor Grazing Act, at some intermediate points, and at present might have been desirable to show what has been done in the grazing use of this area. Individual ranch operators, particularly Leonard Hay of Rock Springs, Wyoming, indicate that great progress has been made.

There is reason to question the use of a "proposed action" as a basis for this ES. It would seem much more logical to treat the "proposed action" as merely one of several numbered alternatives. The various numbered alternatives then should be analyzed and compared on an even-handed fair basis. As the ES is presently written, the "proposed action" is accorded generally positive and favorable statements. Some of the alternatives are accorded generally negative statements. In fact, considering past history, present use, possible biological impacts of the "proposed action" on livestock gains and reproduction and possible economic consequences stemming therefrom, perhaps more positive statements should be accorded some of the alternatives and considerably more negative statements attached to the "proposed action".

It would seem to me that a prudent manager would choose from among the alternatives, including the "proposed action", and implement the alternative that best fits a particular allotment or part of an allotment. The results should be carefully evaluated. Wholesale implementation of the "proposed action" appears to be risky to the point of being foolish.

In relation to the larger scheme of things what happens in the Sandy area may seem of little importance. Certainly, it is small in relation to the national budget, or the larger world affairs. However, the allotment management plans proposed and the grazing ES do concern investments of about $3 million at prices of 1976 or 1977, and perhaps much more by the time investments are made. It does involve about 2 million acres of natural resource lands. It does involve a natural resource base capable of producing around $1 million

in gross receipts and more than $2 million impact on the economy from grazing livestock even considering only about 80,000 AUM's of active use at the present time. Given active use of 125,000 to 150,000 AUM's then the grazing of livestock is capable of producing $1.5 million to $2 million to gross receipts annually at the present time and probably $3.5 to $4.5 million in total economic impact in the area.

Again, this may seem of little importance in the national scheme, and perhaps not even extremely important in the cities of Rock Springs and Green River. Nevertheless, it is highly important to quite a few individuals in those cities. Certainly it is of considerable importance in communities such as Eden, Farson, LaBarge, Kemmerer, Cokeville, etc. That fact should be given greater recognition and weight than has been given.

Respectfully submitted

W. Gordon Kearl

Laramie, Wyoming

10a

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

In Reply Refer To
EGS-OES-78/22
Mail Stop 760

JUN 7 1978

Memorandum

To: Sandy ES Team Leader, Bureau of Land Management
Rock Springs, Wyoming

Through: Assistant Secretary--Energy and Minerals

From: Director, Geological Survey

Subject: Review of draft environmental statement for livestock grazing management, Sandy area, Rock Springs District, Wyoming

We have reviewed the subject draft environmental statement as requested in Mr. Morck's letter.

The environmental statement should at least briefly summarize pertinent details of the occurrence and quality of ground water in the project area. It should indicate any significant natural fluctuations in water levels and ground-water availability. Dry camps and undeveloped recreation seem to be emphasized (e.g., p. 1-39, 2-11, 2-19, 2-15; 6-28, 6-71); however, the statement should address utilization and protection of ground water for recreation and discuss steps taken to protect the public in recreation areas where wells or springs are available. Effects of the existing and proposed reservoirs (e.g., p. 2-19) on ground-water levels and quality should be assessed.

Director

cc: Casper
File
JAfraher:mm

10b

United States Department of the Interior

GEOLOGICAL SURVEY
P. O. Box 1170
Rock Springs, WY 82901

TO: District Manager BLM, Rock Springs DATE: June 1, 1978

FROM: District Engineer USGS, Rock Springs

SUBJECT: Sandy Grazing Environmental Statement

Your undated letter requested the comments of our Oil and Gas Operations Branch of the U.S.G.S. None of the proposed grazing systems discussed in this draft would have any significant effect on oil and gas operations on public land. Access to Wildcat drill sites on newly discovered oil fields could be hindered somewhat by increased fencing thereby restricting where roads can go. As a consequence, fence cuts and/or cattleguards would be necessary.

Perhaps it was in a table I missed, but nowhere in the draft do I see any data on the present dollar value of grazing fees now paid or thoc estimated value with the various alternative. The income to the ranchers from grazing operations is interesting as well as the AUM's but the income from land is something even the government must consider.

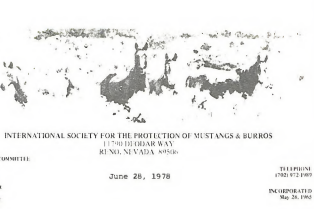
Criteria for wilderness designation is mentioned. Of course if certain Areas become wilderness, this will adversely effect oil and gas operations. The current hassle about the Forest Service's RARE program brings to the fore, the point that oil and gas values are hard to quantify. They are speculative as opposed to timber which can be seen and measured The Overthrust is a classic example where oil and gas values were considered of a minor nature when the RARE studies commenced in 1972 but are of national significance now.

J. A. Fraher

cc: Casper
File
JAfraher:mm

11a

Photo by Alan Kania



INTERNATIONAL SOCIETY FOR THE PROTECTION OF MUSTANGS & BURROS
11700 DEGRAW WAY
RENO, NEVADA 89506

EXECUTIVE COMMITTEE
John Borrez
Chuck John
Alan Kania
Betty Knaebuhl
Lucy O'Brien
Helen A. Reilly
John W. Reilly

TELEPHONE
(702) 972-1005

INCORPORATED
May 26, 1966

June 28, 1978

Dean F. Forsgren, Team Leader,
Bureau of Land Management,
Sandy Environmental Statement,
Post Office Box 1869,
Rock Springs, Wyoming 82901

Dear Mr. Forsgren:

I am enclosing our written statement, which should become a part of Mr. John Borrez's input on the Sandy Area Environmental Statement.

We thank you for letting us express our views.

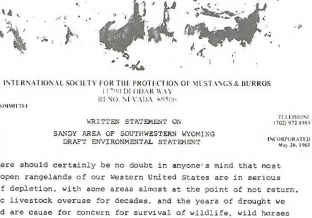
Most sincerely,

Helen A. Reilly (Mrs. John W.)
President

Enclosures (2)

11a

Photo by Alan Kania



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(702) 972-1005

INCORPORATED
May 26, 1966

WRITTEN STATEMENT ON
SANDY AREA OF SOUTHWESTERN WYOMING
DRAFT ENVIRONMENTAL STATEMENT

There should certainly be no doubt in anyone's mind that most of the open rangelands of our Western United States are in serious state of depletion, with some areas almost at the point of not return. Domestic livestock overuse for decades, and the years of drought we have had are cause for concern for survival of wildlife, wild horses and wild burro habitats, and for continuation of a modified (we hope) domestic livestock grazing program. Many land management programs call for rest rotation in order to give the land an opportunity to make a comeback. Rest rotation requires fencing. Fencing is NOT in the best interest of any wild creature, and is costly in dollars and cents ... so the taxpayer who foots the bill for the original installation, and the livestock operators whose reponsibility is to maintain the fence. We cannot help but wonder how responsible they would be, though, since it would be to their advantage to let fences deteriorate so their cattle could go back and forth.

Mr. John Borzea, Director of our executive committee of International Society for the Protection of Mustangs and Burros, will present oral input on our position at the public hearings scheduled on June 28th, in the East Junior High School auditorium, in Rock Springs, Wyoming, which I would like to add to.

We are talking about public lands. Who, then, should have the right to say what it wants and what it does not want on its own land? The public, of course, and it does not want new fencing in this area.

11a

Sandy Area
Page two

tha horsas heve adjusted to tha existing fences. New fancas would be
e problem in the wintar whan there is anow for it would become a trap
for wildlife and horees. Horses have a tendency to run blindly into
them, if they are not accuetomed to them, especially when the horses
heve to be moved for any reason. Barbed wire fancas are especially
dangerous becauas they are not easily aaan by wildlife and horaas, and
they can inflict aarious damage to them.

We believe that in lieu of fences (proposed cost in excess of
two million dollars), range ridars should be hired by the Land Manage-
ment to patrol tha line of fence, to keap the domestic livestock within
tha pasture daaignated for uas and not allow them to cross over into
adjoining land. Thare need not be an army of ranga riders, and their
servicas would be required only during tha seasons when livestock occupy
the grazing allotments.

There would be little if any praasure on tha livestock, and a range
rider would heve to ride the imaginary lina. No herding, or herd riding.
Wildlife and wild horses could cross freely back and forth without the
hazard of being caught up an a fence, and thair impact on the reating
peature would be minimal, compared to what pressures domestic livestock,
in thair far greatar numbers, have put upon tha forage in the past.

As for domestic livestock operatora ... millions of dollars are
lost annually by them through rustling, a crime that is on tha increase
in tha West. Carried out while the cattle are on the open range, few
rustlers are ever caught in those remote and uninhabitad areas. What
would diacourage that kind of operation more than tha presence of range
riders? Possibly just knowing they are out there, on the job, would be
a powerful datarrent.

11a

Sandy area
Page three

In this period of cut-backs in governmental spending, the proposed
excasa of two million dollars required to fence the proposed areas,
which nobody wents to see happen, is not in line with the Administra-
tion's eustara economy meesgras. The cost to employ range riders
would be infinitesimal ... to say nothing of the benefit to wildlife
and wild horsas which cannot be measured in dollars and cents.

We would like to see it tried!

Respectfully submitted,

Helen A. Reilly (Mrs. John W.)
Praaident

11b

July 6, 1978.

TO: Bureau of Land Management,
Rock Springs District, Wyoming.

FROM: Margaret N. Haggard,
International Society for Protection of
Mustangs and Burros

SUBJECT: Sandy Grazing Environmental Statement
(Draft)

The draft of the Sandy Grazing Environmental Statement is confusing and difficult for the ordinary citizen to understand. Worse yet, it is opposed by all - ranchers, environmentalists, wildlife people and those of us who are concerned for the survival of the wild horse.

The BLM proposal to remove some 80% of the wild horses in the Sandy area is unacceptable. The Bureau has no idea what this will do to the wild herds in terms of ability to reproduce and survive. The numbers of horses must be reduced, but they must not disappear by default. The Bureau has not, is not and apparently will not make the studies necessary to determine the factors that will guarantee the survival of the remaining herds. I support the proposal to keep 120 free-roaming wild horses in the Sandy area - 40% of which will remain on the checkerboard lands.

The enormous amount of fencing proposed by the BLM, as a requirement for effective management of cattle, will be devastating to wild life, especially the pronghorn antelope. Fencing must be kept to an absolute minimum. Herding, to be the responsibility of the livestock operators, should be used to control the movement of cattle..

Water development, as a management tool, is not acceptable. In areas of critical winter habitat, the development of water will substantially reduce the winter food supply on which the wildlife depend. To provide water for one species and to deny that same water to other species may be an effective and practical plan, but, it is inordinately cruel.

11b

Riparian areas must be protected from destruction by domestic livestock.

It is incumbent upon the Bureau of Land Management not only to listen to the suggestions of the concerned public but to make use of them. I do hope that the Bureau's final plan will incorporate the best ideas of all who are concerned for the future of the Sandy area and the future of all the life that it supports.

Margaret N. Haggard
Margaret N. Haggard.

James R. Wood
10201 Greenbelt Road, Apt. 518
Bethesda, Maryland 20802

July 1, 1978

Mr. Dean F. Foregren
Bureau of Land Management
Sandy EA Team Leader
P.O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Foregren:

Thank you for sending me a copy of the draft Environmental Statement on Sandy Grazing.

I should like to comment upon the absence of any consideration of the proposed Continental Divide National Scenic Trail. The only reference I could find is contained in map 2, and the route shown there does not conform to that contained in the 1977 Study Report of September 1976.

It is likely that the Trail will follow the north and east rims of the Great Divide Basin, traversing the edges of the Cold Creek and Fish Creek Allotments. The route should probably pass the Sweetwater Guard Station and then angle southeast (perhaps along the Sweetwater River) before reentering national forest and ascending the valley of the Little Sweetwater River. It would next enter 42 land in the Pine Creek drainage and head east to south Pass City. A northerly route is needed here to avoid the steep fall embankment blocking travel down Willow Creek.

While there a number of possible alternative locations, some thought should be given to reserving a right-of-way that will maximize scenic values and minimize conflicts, especially with motorized vehicles. Grazing would not be much of a problem for backpackers, but attention should be paid to waterguality and provision of stiles or fence rates. It might be appropriate to establish a recreation zone, however, for the portion of the Cold Creek allotment north of the Little Sweetwater River.

I should like to see the final environmental statement address these points generally and also in the light of the management alternatives that are discussed.

Very truly yours,

James R. Wood

P.S. Badgers occur in the Cold Creek Allotment. They should be regarded as a desirable wildlife resource for possible observation by hikers along the Trail.

bank, it is cumulative in the statement whether the trending which is planned will occur in an organized pattern or in a random pattern. It would be obviously most valuable if it starts at the higher elevations and gradually works down the stream channels. It is also unclear in the statement whether the BLM would solicit help from state authorities or local groups to expand the boundary beyond the 24 miles.

Lastly, we feel that it is important to note that natural condition of these stream banks is not the condition that they are in now. Grazing has stripped the banks. We feel that protection of the stream banks is a natural part of grazing. If the revenue produced by grazing is not sufficient to fence and protect the riparian zones, then we do not feel that the area should be grazed by domestic stock. We feel that the riparian areas are altogether too valuable to water quality, wildlife, erosion control, reduction in stream sedimentation, protection of downstream water projects such as Flaming Gorge, aesthetics, and protection of public wildlife.

Yours,

Fred Reinherr
Conservation Chairman

James Talley, President
Chairman, Utah Trout Unlimited

Karl Hebenreich, President,
Order of the Royal Gorbaks
Pleasant Grove, Utah
Chairman, Utah Federation of
Fly Fishermen

Bruce Solomon, Vice President

Arthur Bittman, Member
Executive Committee

Howard A. Ballard, Secretary

David W. McCormick, Member
Executive Committee

Bill Hager, President, Northern
Utah Fly Fishermen

Copies - High Country News, Wyoming State BLM Office, Wyoming Game and Fish Dept.
NATIONAL RECREATION ORGT. COUNCIL

STONEFLY SOCIETY of the WASATCH FLY FISHING CLUB

DEDICATED TO UTAH'S FLY FISHING FUTURE
July 3, 1978

MEMBER CLUB
UTAH COUNCIL

Neil F. Morck, District Manager
Bureau of Land Management
Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Morck;

We are writing to present our views concerning the "Sandy Grazing Environmental Statement". A number of our club members are involved in recreational activities throughout Southeastern Wyoming. Thus, we feel we have valid concerns regarding your grazing plans, and would appreciate having copies of all future BLM impact statements in Southeastern Wyoming.

At the present time, you are planning to devote all extra forage generated by your improved management to the expansion of domestic grazing. In view of the problems with erosion, water quality, lack of aquatic, riparian habitat, and the heavy demands upon this area by wildlife, we feel the heavy emphasis on grazing expansion is misguided. In view of the rapid growth of the Rock Springs area and the surrounding areas of Colorado and Utah, we feel that the expansion of recreational opportunities should be the first priority. When one further considers the psychological and social problems of the Rock Springs area, this is even more compelling.

On page 5-3, it is noted that resident and spawning habitat for trout would be decreased by 20 percent and 10 percent. Game fish populations would be decreased by 25 to 35 percent. On page 1-80, it is noted that grazing in riparian habitats would increase by 66 percent in the three pasture rest rotation system units, and by 100 percent in the two pasture rest rotation system units. Finally, the statement notes that there will be a significant adverse impact upon stream bank stability. All these impacts occur inspite of fencing 26 miles of streams. We view these impacts as extremely destructive. We wonder whether or not your grazing system is not really just a more efficient method of destroying the riparian zones.

In view of the actual operation of rest-rotation grazing, in which animals are crowded together to produce a uniform stripping of the range, we feel that even these adverse impacts do not adequately describe the damage which will occur. In fact long term studies of the impact of rest-rotation grazing on riparian habitats have not been done(personal communication, Don Duff, Utah BLM). To achieve adequate regrowth in riparian areas requires fencing, replanting, and protection for 3 to 8 years.

JACK WILSON, SR.
Phone 875-3556

JOHN L. YERKOVICH
Chairman
Phone 382-5076

D. S. FERRERO
Phone 875-6084

GREEN RIVER PHONE
875-2911

COUNTY OF SWEETWATER
BOARD OF COUNTY COMMISSIONERS
GREEN RIVER, WYOMING 82935

July 6, 1978

Mr. Dean F. Foregren
Team Leader
EIA
Sandy Environmental Statement
P. O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Foregren:

Please find enclosed a copy of the Resolution as adopted this day by this Board.

Yours truly,

John L. Yerkovich
Chairman

JLY/abv
CC:
Mr. Calvin Ragsdale

RESOLUTION

WHEREAS, the Bureau of Land Management of the United States Department of Interior issued its draft Sandy Grazing Environmental Statement on May 26, 1978; and

WHEREAS, the proposed action set out in said statement affects land and persons primarily located in the County of Sweetwater, State of Wyoming; and

WHEREAS, said statement appears to be a document designed to justify the proposed action rather than to examine the environmental effects of the action and all reasonable alternatives to said action; and

WHEREAS, said statement does not consider all reasonable alternatives to the proposed action, as pointed out by many of the witnesses at the public hearings on said statement held on June 28, 1978; and

WHEREAS, said statement is filled with internal inconsistencies; and

WHEREAS, said statement does not adequately consider the economic impacts of the proposed action on the livestock operators, on the recreational industry of the State of Wyoming, or on other users or on the lands of either the federal government, state or private users; and

WHEREAS, the statement gives no consideration to the impacts of the proposed action or any of the alternatives of the non-federal lands within the area; and

WHEREAS, the statement does not present adequate scientific justification for any of the projected desirable results listed for the proposed action and fails to adequately consider the potential adverse results of the proposed action; and

WHEREAS, the proposed action, by its own terms, necessitates the building of over 550 miles of fence within the study area, an amount of fencing criticized and rejected by every witness who has ever testified on the proposal before the BLM, although all witnesses recognize that proper fencing after proper and reasonable study with full consideration given to environmental considerations, can be and is a desirable tool for riparian wildlife habitat protection and livestock management; and

WHEREAS, the statement has not adequately assessed water developments as a management tool, whether for livestock management or wild animal management, neither has it adequately considered herding of livestock as a management tool; and

WHEREAS, the statement assumed free-roaming horse management, which in light of past Bureau management is optimistic, at best, and misleading, at worst, and whereas, any consideration of proper grazing practices on the federal lands must, of necessity, address and solve the management problem of free-roaming horses; ~~and whereas the statement does not adequately consider the environmental consequences to federal, state and private lands of the failure of the horse management plans set out in its statement~~ and

WHEREAS, witnesses at the public hearings on said statement on June 28, 1978, expressed concerns that the proposed action would be inimical to the livestock users of the federal lands, to the wildlife habitat of the lands, to the continued recreational use of the lands and to the well-being of the lands themselves, none of which are adequately assessed or addressed in the statement;

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Sweetwater County, Wyoming, that:

1. The Commissioners do hereby go on record as opposing the statement and any implementation of the proposed action contained therein on the grounds that the draft statement is totally inadequate under the terms of the National Environmental Policy Act of 1968;

2. The Commissioners do hereby urge the Bureau of Land Management of the United States Department of Interior to rewrite the draft environmental statement and produce an adequate environmental statement which considers all reasonably anticipated environmental impacts of the proposed action and which considers all reasonable alternatives to the proposed action and the environmental impacts thereof;

3. The Commissioners do hereby state that any such rewrite of the environmental statement should consider specifically the proposals and alternatives suggested by the public by its oral comments at the June 28, 1978, hearings and written proposals submitted within the time set by the Bureau;

4. The Commissioners urge the Bureau of Land Management of the United States Department of Interior in future proposed actions to more adequately solicit the advice and comments of all users of the public lands and that it reasonably consider and address all such advice and comments thus elicited;

5. The Commissioners do hereby urge that in future environmental impact statements concerning proposed federal actions in this geographic area, the Bureau allow a minimum of 90 days for public comment after the issuance of the statement.

Dated this 6th day of July, 1978.

[signature]

[signature]

[signature]

ATTEST:

[signature]

SWEETWATER COUNTY
WILDLIFE ASSOCIATION
390 Desert Lane
ROCK SPRINGS, WYOMING 82901

STATEMENT ON SANDY GRAZING ENVIRONMENTAL STATEMENT DRAFT

Thank you for giving me this opportunity to comment on the Draft of the Sandy Grazing Environmental Statement. It seems utterly ridiculous that the BLM could expect the majority of the interested general public to fully comprehend, analyze, and comment on a document of this magnitude in about a month when it has taken the bureau, with many individuals, years to study and report. I first will ask that the deadline for written comments be extended in order to allow more people the time to make their feelings known.

The proposed action of implementing a domestic livestock grazing management program on national resource lands within the Sandy Planning Unit of the Green River Resource Area in the Rock Springs District is totally unacceptable. Any consideration given to wildlife in this proposal, and there is very little, in only accidental resulting from some facet of intensive grazing management. Under this proposal, critical winter habitat in many places will be reduced if not altogether destroyed. Riparian habitat and fisheries will be greatly reduced. Potential antelope and deer populations will be lost. Sage grouse and waterfowl habitat will be depleted. Recreational opportunities will be seriously affected in many areas.

The fencing proposed in the draft and many of the alternatives could have a very detrimental effect on wildlife species, perhaps contributing to the decimation of our antelope herds. In the winter of 1971-1972 antelope mortality ranged between 43% and 75% within the Sandy Area. With the addition of the proposed fences, a similar winter could easily exceed the 75% mortality level. With our mounting populations and future industrial pressures such as coal mines, uranium mines, trona mines, gas and oil wells, etc. will our antelope be able to come back as fast, if at all, the next time?

In past preliminary hearings and discussions with BLM personnel, we had been led to believe that water developments would be constructed and utilized by both wildlife and livestock. However, according to the Draft "Most of the proposed 39 wells would not benefit pronghorn from June thru October since they would be turned on only when the pasture was being grazed by livestock." Why? I seriously question the results of the benefit-cost analysis. Have the cost of future maintenance and supervision been taken into consideration? Have the benefits been overexaggerated?

Like the proposal, the alternatives are totally unacceptable. The only alternative that even truly concerns itself with wildlife and recreation is alternative 2, discontinuance of livestock grazing. Of course this alternative is unrealistic and impractical. Livestock and wildlife have been able to live in the some environment for decades. There is no reason to believe that they sould not be able to continue to co-exist although more emphasis must be placed on wildlife management in the future.

Alternative 1, No Action, is contradictory. Isn't the fencing of the checkerboard land boundary an action? This alternative fails to initiate any positive approach to the future management of our lands.

Alternative 3, allow conversions without fencing, is totally unrealistic. It would be difficult, at best, to manage cattle without fences. Proposed water developments, many of which are located in critical winter habitat, would be very detrimental to wildlife populations resulting in large losses because of lack of feed.

The livestock operators proposal, alternative 4, is unacceptable. It would be impossible for any agency to regulate and control livestock with a 10-15% drift allowable. Again the fencing, although less than the proposed action, would be detrimental to wildlife and recreation. Water developments have been proposed to scatter the livestock over the entire area with no concern for critical winter habitat.

Alternative 5, grazing reduction where excessive soil erosion and poor livestock range conditions exist, is also unacceptable. The same fencing and water developments are contained in this alternative as in the proposal.

The site specific alternative is also unacceptable for the same reason.

It is interesting to note how the writer has tried to make the proposed action sound like the best route to follow throughout the draft. For instance, when talking of wildlife population impacts, the alternatives show only the worst case situation that could result only if all potential adverse conditions were to occur simultaneously. The proposed action speaks more in terms of expected or average losses.

There are good points to be found in each altervative. For instance, alternative 1 shows a need for aesthetic quality. Alternative 2 concerns itself with fulfilling objectives for wildlife and wild horses. Alternative 3 entertains the

STATEMENT OF SANDY GRAZING ENVIRONMENTAL STATEMENT DRAFT
Page 3

necessity of minimizing fences. The livestock operators alternative shows that water developments can be utilized for controlling livestock movement. Alternative 4 shows the need to protect some of our more erodable soils. Alternative 5 shows the need to minimize livestock use in areas of wildlife critical winter habitat. Unfortunately, there is no one alternative which can be acceptable to the future programation of our wildlife species providing continued recreational enjoyment for the public. As a result, we propose that the following points be incorporated into the recommendation.

1. Objective for wildlife and wild horses should be considered first. They should not be on a afterthought to the program.

2. Conversions from sheep to cattle should be limited. This would minimize fencing needed. The small herds itself work to sheep erosion. If conversions were allowed, livestock operators might want to convert back in a few years because of market fluctuations.

3. Limit the livestock use in critical winter habitat areas. Don't develop water in these areas.

4. Minimize fencing for livestock use. Utilize fencing to protect riparian habitat and water developments. Do not fence the checkerboard land boundary.

5. There should be more water developments throughout the area on summer habitat.

6. Continue with non-use where it currently exists until the long term carrying capacity of the area is determined.

7. Test existing intensive grazing systems (i.e. in the Burnt Fork Area from Tennaree) before implementing another intensive system.

8. Existing use should continue as is on all pastures with the exceptions noted in these recommendations.

9. Cattle and sheep should be regulated by heading and water developments.

10. There should be a grazing reduction where poor forage and soil erosion exists.

11. There needs to be a forage allocation for AUM's and a reservation for winter forage.

12. Improve riparian habitat and aspen habitat.

13. There should be a block out of surface rights on the checkerboard lands. If needed, an arbitrator should be used to work out a trade.

STATEMENT OF SANDY GRAZING ENVIRONMENTAL STATEMENT DRAFT
Page 4

14. A study should be made to determine whether existing fences are detrimental. Any detrimental fence should be eliminated.

15. Elk ports on the Piney should be constructed of the same material as the fence.

16. Wild horses should be reduced to the 1971 level and managed at that level.

17. A minimum of 100 wild horses should be managed on the checkerboard lands.

18. Wild horses should be managed in the total area; not in only two small areas.

It is our feeling that the above points must be made a part of the recommended action in order that our wildlife, fishes, soils, and waters may perpetuate themselves. The outdoorsmen, rancher, and wildlife can live together, but we must plan now for the future.

Respectfully submitted,

James E. Horner
President

MIDLAND-DUNTON SHEEP COMPANY
227 "H" Street
Rock Springs, Wyoming 82901

July 5, 1978

Mr. Dean F. Foregren
Team Leader
Bureau of Land Management
Sandy Environmental Statement
P. O. Box 1869
Rock Springs, Wyoming 82901

Re: Draft Sandy Grazing Environmental Statement - Comment

Dear Mr. Foragren:

Please consider this letter as my comment on the Draft Sandy Grazing Environmental Statement.

I have a general lack of confidence in the data presented in the Draft Environmental Statement due to obvious errors in material and data that I am acquainted with. A few of these errors consist of stated base property qualifications of the Sandy area and in several of the allotments, errors in increased forage production as compared to proposed livestock use at the start of the proposed program, and indicated cuts in livestock use varying from 18% as stated in Chapter 1 as against a 9% reduction as stated in Chapter 3. The writer of Chapter 3 obviously compared base property qualifications on Public Lands before the cut with public land use and private land use after the cut to arrive at the lesser percentage reduction. This is an obvious error.

The determination of allowable carrying capacity for livestock at the start of the proposed plan is very questionable as is it's source. It appears that this proposed carrying capacity was derived from carrying capacities determined during previous accepted range survey procedures and which were adopted through the adjudication process. Numerous assumptions and averages were applied to the previous range survey data and then recomputed, the result of which indicates further downward adjustment (a cut).

Mr. Dean F. Foregren
July 5, 1978
Page 2.

Range survey data is an estimate at best. To take estimates and apply assumptions and averages to estimates does not improve the reliability of the data, but only further deteriorates the presumed accuracy of the data.

Proper use factors used in determining carrying capacity are proper use factors for selective grazing. The intended plan is for a more intensive grazing management system and, therefore, proper use factors based on selective grazing no longer apply.

The most logical approach for carrying capacity under the proposed plan or any intensive management system is to start with existing grazing intensities and through actual use knowledge to be determined and changes in range condition and trend, the grazing intensity (allowable use) can be adjusted.

I recommend that the carrying capacity for the start of the proposed plan or any proposed plan in the Sandy area be the base property qualifications as they exist today for the reason the proposed allowable use is presently by the method of determining carrying capacity, demands for wildlife population, current or desired, and the factors used in determining the proposed carrying capacity.

The proposed plan proposes to take the Buckskin-Sandy Individual Allotment away from Midland-Dunton Sheep Company and include it in the Prospect Mountain Allotment.

The Buckskin-Sandy Allotment was established as the result of an adjudication and agreement by permittees and the Bureau of Land Management. The Buckskin-Sandy Allotment has been improved by Midland-Dunton Sheep Company through structural and non-structural range improvements. The only privately controlled land in the Buckskin-Sandy Allotment is owned or controlled by Midland-Dunton Sheep Company. It is a well known fact that the highest degree of management and results in range improvement can be attained on individual allotments. Midland-Dunton Sheep Company does and will continue to resist any effort to take the Buckskin-Sandy Allotment away from Midland-Dunton Sheep Company.

It is recommended that the Buckskin-Sandy Allotment be put into a two pasture deferred rotation system for the use of Midland-Dunton Sheep Company. This will cause a continuation of the high degree of management that this area has had in the past and will also avoid the necessity of removal and reconstruction of fences as proposed in the proposed plan.

Mr. Dean F. Peregren
July 5, 1978
Page 3.

The proposed plan provides for fencing the Reservoir Allotment into three fenced pastures. The Reservoir Allotment is an individual allotment of Midland-Dunton Sheep Company, the major portion of the use on the Reservoir Allotment is by sheep which are herded. It is a waste of time, effort, and funds to fence pastures for sheep which are herded. The small amount of cattle and horse use in the Reservoir Allotment can also be herded as needed in order to conform to the prescribed grazing treatments. If it is determined at a later date that cattle use would be increased or that the herding is not effective, then at that time the interior fences could be constructed if needed.

The basic purpose or the proposed plan appears to be to accommodate the conversion of sheep to cattle. The proposed management system proposes to confine sheep and cattle into suggested small areas during certain seasons of the year and especially during lambing season.

There is no known rest rotation system involving sheep that either improves the range or livestock or both. To confine sheep to these small compacted pastures will damage both the range and the livestock. It is necessary in sheep operations, especially during lambing, to have sufficient room and area for the sheep to spread out, be undisturbed, and have availability to forage and water. The proposed plan involving the rest rotation sytem does not provide the necessary room or area required for sheep operations. It is recommended that the rest rotation systems involving sheep be modified to the extent that the cattle would be confined to the system of grazing as large numbers of cattle can be controlled in this manner. In the same system the sheep should be afforded the opportunity to graze over the entire area in order to maintain the sheep and range in a healthy condition. If provisions are not made for sheep to be grazed differently than the formula for grazing cattle in a rest rotation system, rest rotation grazing will be the doom of the range sheep industry.

The proposed plan proposed to have entering dates for grazing in the Prospect Mountain Allotment and other allotments as May 16th rather than the current May 1st entering date. This impact is mitigated by changing the entering date back to May 1st. This mitigating measure is acceptable and recommended to be adopted. It is also recommended that another mitigating measure be applied to the proposed 18% cut in livestock use by making a lesser cut or not cut as previously mentioned.

Mr. Dean F. Peregren
July 5, 1978
Page 4.

In considering the proposed actions and the several alternatives to the proposed action, it is recommended that the proposed action be adopted with adjustments applied to the proposed action as set out above.

Very truly yours,

MIDLAND-DUNTON SHEEP COMPANY

By: John T. Rowell

2014½ Sheridan
Laramie, Wyoming 82070
July 8, 1978

Dean F. Peregren
Team Leader
Bureau of Land Management
Sandy Environmental Statement
P. O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Peregren:

This letter is intended as written comment on the Sandy Grazing Environmental Statement draft. I am a graduate student at the University of Wyoming, and for the past two years I have been studying the feral horses on part of the area covered by this impact statement. As background, I have a bachelors degree in wildlife management with enough hours in range management to qualify for the federal register as a range manager; also I spent two years in Thailand as a wildlife biologist.

I feel that the Bureau should be commended on proposing a management plan which considers the needs of livestock, wildlife and wild horses. Contrary to the majority of the opinions presented at the public meetings in Rock Springs, I do not feel that wild horses and wildlife would necessarily be adversely effected by the proposed fencing system. It seems to me that some sort of control by the B. L. M. is important if the Bureau is to reduce trespass problems and accept responsibility for improving range conditions. The only paper I can find on grazing systems in the Red Desert (Hibbens and Fleser 1975) did not determine what the effect of grazing management would be with either a normal stocking rate or less than normal rainfall. I feel that under those conditions the proposed system would be beneficial.

I would like to direct the rest of my comments to the proposed wild horse management. Again, in general I feel that the Bureau should be commended, especially for the large size of the management units and for recognizing that water is the key to wild horse management. Also in the Continental Peak

Wild Horse Unit the boundaries come very close to allowing the movement patterns which have developed naturally to continue. I think this shows a good deal of thought and careful planning.

I do have some suggestions concerning wild horse management as presented by the Environmental Statement:

1) I feel that it is important that more than just sufficient water be provided for the horses. When water is limited, horses concentrate around water, and competition with livestock and impact on vegetation is increased. When ample water is available horses generally drink their fill within three minutes and return to grazing areas distant from water. If water is limited the horses spend most of their time within one mile of water.

2) The idea of moving horses with cattle to water may or may not work. The horses I am working with now have located and in some part moved on to a well two miles from their usual watering place, while they apparently have not located another well approximately two and a half miles away. I do not believe it possible to move most wild horses, or any sage grouse or antelope, to new water sources that are at all distant from their accustomed water holes. I feel that water should not be shut off after cattle are moved from a water hole.

3) The number of wild horses the Bureau plans to leave in the Continental Peak Unit fits well with my limited guesses of proper carrying capacity based on water available in the southern part of the unit. I suggest that the proposed number of horses in the Little Colorado Unit be raised by 100 animals. I believe that the minimum population which can be sustained without significant inbreeding is approximately 100 animals. Since it cannot be predicted with accuracy if groups of horses in the Little Colorado Unit would exchange members and since the estimates of minimum numbers may be off, it would be better to have a few over the minimum breeding population rather than a few under the necessary number.

4) Due to the lack of information about wild horses and limits on what we can gather on our project, I suggest that the Bureau undertake limited wild horse research. Most important would be a project to determine areas of use and movements. I suggest that the Bureau equip four horses in each management unit with solar powered radio collars and then locate these horses once a month for two years. These known movements could be used to assess future management and to determine the effects of present management. Also I suggest that the water needs of wild horses be studied in the field.

5) I would like to suggest specific management alternatives for the more than 300 horses presently using Fourth of July Well (Section 21, R10CW T23N). These horsed spend most of their year in the Wild Horse Management Unit, crossing into the checkerboard primarily to drink at this well. They make up almost all of the horses shown on Map 2-30 as using two townships in summer (T24N R10CW and T24N R11CW) and four in winter (T23N R99W, T23N R98W, T24N R99W, T24N R98W).

Actually, the summer range shown in green should be shifted south about three to four miles. If the fence along the checkerboard is built as planned, it will cut these horses off from summer water if built in the spring, fall or winter, or from winter range if built in summer. The only alternative water is an abandoned oil well in Section 7, R99W T23N, which as recently modified cannot provide sufficient water and which would require holding horses over summer in areas which are now spring and summer ranges. I suggest three alternative management plans: 1) build a well north of the checkerboard in Section 1b, R10CW T23N before fencing, 2) remove all the horses that use Fourth of July well before fencing, or 3) trade the private land owner for Section 21 R10CW T23N and the quarter section of Section 15 R10CW T23N which is now private. This would allow the horses to continue the movement pattern which has built up over the years, assure a minimum of problems with horses in fences and approximate a normal movement boundary. This choice has the added advantage of providing water in both

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pastures, as a well was built last fall in Section 33, R10CW T23N. I favor the third choice because it would allow normal movements and provide a relatively undisturbed, well studied population for monitoring the effects of other management actions, and because water would be provided for livestock and wildlife in both pastures. I have devoted this much time to this last suggestion because I feel that the possibility exists for a large horse die-off if the horses are fenced off from water before other water is provided or the horses are removed.

Thank you for your time in considering my comments.

Sincerely,

Richard Miller

FRANK RANCHES

GARY and DIANE FRANK
Box 18 Lyons Valley Route
Lander, Wyo. 82520
Phone 307-332-4062

WILLIAM and PAULINE FRANK
Box 42 Lyons Valley Route
Lander, Wyo. 82520
Phone 307-332-5704

BILLY and JEANNE FRANK
Box 20 Lyons Valley Route
Lander, Wyo. 82520
Phone 307-332-4988

July 7, 1978

Dear F Foregoin
Team Leader
Bureau of Land Management
Sandy Environmental Statement
P.O. Box 1869
Rock Springs Wyoming

Dear Sir:

I am enclosing a copy of a letter which I have previously sent to the B.L.M. office regarding the proposed management plan of the Gold Creek Allotment.

We would like emphasize that we want to continue as a private allotment which was one of our purposes of purchasing this allotment. We have run in common before. Also the original grazing plan has not been fully implimented and proves unacceptable and now we have an unacceptable proposed trying to be pushed on us.

I'd like to make input to the environmental statement.

Sincerely,
Frank Ranches Inc
Gary Frank

18

FRANK RANCHES

GARY and DIANE FRANK
Box 18 Lyons Valley Route
Lander, Wyo. 82520
Phone 307-332-4062

WILLIAM and PAULINE FRANK
Box 42 Lyons Valley Route
Lander, Wyo. 82520
Phone 307-332-5704

BILLY and JEANNE FRANK
Box 20 Lyons Valley Route
Lander, Wyo. 82520
Phone 307-332-4988

April 24, 1976

B.L.M. District Office
Box 1869
Rock Springs, Wyoming 82901

Dear Sirs:

I am writing regarding the proposed management plan which combines the Gold Creek and Valley Creek allotments.

These two allotments should not be combined because the operators are running different breeds of cattle and using different breeds of bulls.

Under the proposed management plan, only one half the range would be used each year. This would create many problems. Some years, the upper pastures, both Gold and Mill, are unavailable by the first of June because of huge snowdrifts across Gold Creek or high water making it impossible to cross cattle.

Both operators wean their calves in the early part of October. Two years the cows are in the upper pastures (Gold and Mill) would cause great damage because they couldn't be found to take the calves off of the cows to wean. Also, an early large snowstorm while the cows are in the upper pastures could cause great economic loss not only in weight loss but possible death.

Such a grazing plan would be harder on the range because the cows would be forced to eat nearly all the available feed including browse plants and other wildlife habitat they would not normally eat. More erosion would occur because the travel would be more concentrated, especially when feed becomes less. The proposed three wire fences would not control these cattle with extensive grazing in one half the total area. The cattle would break through to get to better feed. A more costly four wire fence would be needed to contain these cattle.

Further economic losses would be incurred by the operator because the cattle would not gain as well with a limited supply of feed. This range would be divided into four pastures with all the cattle of both operators in only one pasture at a time. This would create many problems among the cattle themselves, mainly among the bulls. This is too small an area for this many bulls and would lead to constant fighting and crippling of many of these animals. An adequate supply of bulls must be run to insure proper fertilization of the cows.

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B.L.M. District Office page 2 April 24, 1976

Under this proposed plan the operator would take a cut in A.U.M.'s. This is not necessary because this range is understocked, hence not grazed to it's full potential, and has already taken a 30% reduction in A.U.M.'s in 1970.

Such a grazing plan would inhibit the normal movement of wildlife. The Gold and Mill pastures are Elk calving grounds. Every other year the cattle would be here at the same time. Also the Spring following the grazing of the Gold and Mill pastures, there would not be any feed left over and the elk would have to rely on new growth, which comes later in these pastures than the lower pasture. Each year would be a change for where feed would be available causing constant changes for these animals.

Big game hunting seasons start the first of October. At this time the cattle should be in the lower pasture (Sharps), so the hunters would not be bothering them and they would not be bothering the hunters.

The Gold Creek Allotment needs a grazing plan which takes into consideration the effects of the climate and other environmental impacts such as big game hunting.

The Sharps pasture starts growing first and is followed by the Gold and Mill pastures, in that order. It should be used first and last, using the Gold and Mill pastures in-between. With proper manipulation of the periods of grazing, they will be reseeded and establish vigorous growth. It is not necessary for every single plant to reseed to establish more than an adequate supply of new seedlings. A timetable could be set up according to the needs of each pasture. If one pasture needs less grazing, shorter the time the cattle would be there. This would be established annually by a cooperative effort between the B.L.M. and the operator.

With such a plan, the cattle would not bother the elk in the Spring nor would the hunters bother the cattle in the fall. The cattle would be available to wean the calves in the Fall and insure that they would all be found before winter storms make it impossible to locate them. The range would be reseeded and continuously improved.

A practical plan must be used so that the operator as well as this resource land, and the general public will benefit from it.

Both operators, Frank Ranches Inc., who operate the Gold Creek Allotment, and Willow Brook Ranch, who manage the Willow Creek Allotment, have invested considerable time and money into improvements on this range. Frank Ranches Inc. has invested $2100.00 in the Jack Ranch fence, $3965.90 in Gold Creek South Division fence, and $2250.00 in labor on the highway fence. When the boundry fence between Willow Creek and Gold Creek allotments is finished the two operators will have another $7250.00 invested, plus the labor on west boundry fence and materials where it crosses private and state lands. This adds up to quite an investment!

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B.L.M. District Office page 3 April 24, 1976

Twenty-three percent of this allotment is not United States Government land. It is private land and State leases run in conjunction with the B.L.M..

We feel a better plan is possible and sincerely hope that you give this enclosed proposal some serious thought before implementing any plan . No operator on a private allotment would want to damage his range because this would only be hurting himself. He relies on this allotment year after year and keeps building for the future.

Sincerely yours,
Frank Ranches Inc.

Gary Frank

Gary Frank, Vice President
B.S. Animal Husbandry, U.W., '66

GF:dlf

cc: Arthur L. Tait, Green River Resource Mngr., Rock Springs Dist. Office
William Taliferro, Member of Stockmens' Advisory Board
Bill and D. J. Sherlock, Willow Brook Ranch

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Box 1471
Cheyenne, Wyoming 82001
July 6, 1978

Dean F. Foregren
BLM
Sandy ES Team Leader
P. O. Box 1869
Rock Springe, WY 82901

Dear Dean:

I would like to submit the following comments on the Draft Sandy Grazing Environmental Statement.

The sectione on Threatened and Endangered Plante, pages 2-53 and 3-45, need to be updated and expanded. Other parts of the document will then need to be revieed to reflect this updating and expansion.

Lesquerella macrocarpa occurs in the Steamboat Mountain, Bush Rim, and Continental Peak allotmente. It ie not affected by proper etocking rates of liveetock. The population in the Continental Peak Allotment has almoet been destroyed by trampling from an exceseive population of wild horses. The Endangered Species Act etatee that government agenciee muet ensure that actione carried out by them do not jeopardize the continued exietence of any endangered or threatened speciee. The action (or inaction) of allowing an overpopulation of wild horeee would seem to be a violation of this Act.

Antennaria arcuata has been found about 5 miles southeast of Atlantic City. It may be present in nearby allotments of the Sandy Unit. This is one of the few endangered or threatened plante that ie advereely affected by livestock grazing. Discovery of the speciee in a grazing allotment will probably require complete protection from livestock. The Endangered Species Act appeare to require the BLM to conduct an inteneive survey to eneure that this speciee is not preeent in the grazing allotments, or if it ie, to provide adequate protection.

If you need more epecifics or documentation, feel free to call on me.

Sincerely,

Robert D. Dorn

Robert D. Dorn

cc: Dan Baker, State Director

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TROUT UNLIMITED

NATIONAL HEADQUARTERS
4260 E. Evans Avenue
Denver, Colorado 80222
303/757-7144

July 7, 1978

Dean F. Forsgren
Team Leader
Bureau of Land Management
Sandy Environmental Statement
P.O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Forsgren:

I appreciate the opportunity for Trout Unlimited to review the Sandy Grazing Environmental Statement. Our organization has an intense interest in the management and use of our public lands especially the impacts of those users on the riparian/stream ecosystems.

TU strongly supported the BLM Organic Act to provide BLM with the legal mandate and authority to fully manage our public lands. In reviewing the Sandy E.S. we were dismayed to find, despite pronouncements from Washington on the new direction and mission of the BLM as a steward of public lands, a "business as usual" approach with primary emphasis on livestock grazing to the detriment to other equally or more valuable resources. We find the Sandy E.S. in apparent flagrant violation of the Multiple Use - Sustained Yield Act, NEPA, and PL 93 - 320 (Colorado River Salinity Control Act).

Under the Multiple Use - Sustained Yield Act, the Secretary of Interior is directed to meet the needs of the American people by the most judicious use of public lands and specifically calls for periodic adjustment in use to conform to changing needs and conditions. BLM records show that roughly 70 to 80% of western riparian/stream ecosystems are in a badly degraded (poor) condition primarily due to livestock grazing impacts. The NEPA directs all federal agencies to interpret their management functions to preserve and enhance all natural resource valuues, and allows citizen law suits where this is not done. The Sandy grazing plans will result in a further net deterioration in the riparian/stream habitats in the Sandy Area. The rationals for this statement are as follows:

1. *The Sandy allottment is presently predominently sheep grazing. The new management plans will change this to predominently cattle grazing. Cattle are significantly more detrimental to riparian/stream ecosystems than sheep.*

2. *One stated goal of the proposed action is that of improving habitat conditions for about 300 miles of stream. Yet rest-rotation grazing would be applied to the majority of the range (92% of the 1,967,730 acres). Rest-rotation grazing has not been demonstrated to be a viable approach for improving, protecting or maintaining aquatic habitats in arid or semi-arid regions. (We are thoroughly familiar with the Forest Service's Diamond Fork Study in Utah.)*

When the Sandy E.S. Draft and other BLM documents pertaining to range management are read, the impression is strongly conveyed that BLM technicians involved with devising range management programs are either not aware of proper methods for managing riparian/stream habitats, or there is an inherent insensitivity in BLM for the importance of these valuable resources. We in Trout Unlimited are firmly convinced that with proper management our public lands can provide greatly improved fish and wildlife resource values and improved livestock grazing potential, but it will require some innovative grazing and riparian zone management strategies. The Sandy E.S. Draft is disappointingly short of innovations.

3. *The proposed action calls for 5% miles of fencing as necessary for livestock management. Only 26 miles of this fencing will be used to protect the far more valuable riparian/stream zones. Trout Unlimited has been repeatedly told by BLM range managers that fencing was too expensive to consider as a protective measure for our valuable western riparian habitats (only 22,000 acres of riparian habitat of 21,000,000 acres in Utah). Yet fencing is apparently not too expensive to use in implementing a relatively untested rest-rotation grazing system. The proposed action's reference to Hormays Assessment of rest-rotation would indicate that BLM range managers are aware that cattle will continue to congregate along streams and perpetuate damage to streams under a rest-rotation system. We contends that far too few miles of critical stream areas will be protected by fencing under the proposed action.*

4. *A properly executed Environmental Statement must present all options. The Sandy E.S. does not consider the option of no grazing. Trout Unlimited does not advocate removal of livestock grazing from public lands. We recognize this as a proper and legitimate use of the resource when kept within reasonable bounds. The proposed action plans to significantly increase the AUM's in the Sandy area over the next 23 years (from present 77,274 AUM's to 154,028 AUM's). This action is planned in an already overgrazed area. The claim that rest-rotation management will improve range conditions to that capacity and improve the fishery conditions is highly speculative, extremely doubtful, and not based on factual data. The proposed action plan should include test areas of no grazing, no change in grazing intensity, and increased grazing along stream sections as a guide to future management planning.*

-2-

The Wilderness Society
7/8/75

P.O. Box 1184, Cheyenne, Wyoming 82001
Telephone (307) 638-3416

Mr. Dean Forsgren
Bureau of Land Management
Sandy ES Team Leader
Box 1869
Rock Springs, Wyoming 82901

Dear Dean:

I regret that I was unable to attend your hearing on the Sandy Grazing EIS. However, on behalf of The Wilderness Society I'd like to submit the following comments.

1) We would like to so on record in support of the statement submitted on behalf of the Wyoming Chapter of the Sierra Club presented by Laney Mick and the concerns expressed by both the Sandy Livestock Users Association and the Sweetwater County Wildlife Federation. I was greatly impressed with the work that the ES team has done, and with the quality of the background ecological information presented in the text.

2) I'd like to present a few comments of my own -----

A) The Wilderness Society does not want the Red Desert used as "test case" for unproven range programs. I believe that you need much more data on the "on the ground situation" and far less statements about the "anticipated range condition".

B) My other major concern deals with excessive, large-scale fencing proposals -- to the tune of 536 miles of new fence. One only needs to cite the language in Chapter 3 of your report to uncover the fact that your "management"proposal will be disasterous to our world renowned Red Desert pronghorn herds. Let's look at the following:

--"In other allotments proposed water developments in crucial winter habitat...would contribute to pronghorn mortality through summer utilization of winter habitat areas.... The Additional summer use would therefore reduce the carrying capacity of the crucial winter habitat which is essential to pronghorn survival." (p.3-50)

-- "It is estimated that the proposed fences combined with existing fences would impede or change typical pronghorn migration routes between winter and summer habitat in the Sandy area."(p.3-50)

--"It is absolutely necessary that all antelope in these areas move freely to lower winter ranges."(p3-50)

--"The reason that (fences) have not posed a problem on rangelands to a significant degree is due to the present lack of fencing on ranges". (p.3-54)

--"Depending on weather conditions, virtually all of proposed fencing would be hazardous to pronghorn."(p.3-44)

C) Fence design is another major problem: you propose 38 inch high fences and cite studies that say that that height will seriously impede pronghorns; again you propose that a 10 inch height for the lower strand should be used and cite studies that totally refute that figure... and you propose inadequate spacing between strands according to your statements on the bottom of page 3-44 and the top of page 3-45.

"In Wilderness is the Preservation of the World." Thoreau

In summary, based on the proposed action plan of:

1. *Changing grazing from predominantly sheep to cattle,*
2. *Significantly increasing the AUM's*
3. *Little protection of the fragile stream habitat by fencing (26 of 300 miles)*
4. *Virtual complete reliance on untested rest-rotation grazing system to protect and improve the aquatic habitat.*

Trout Unlimited submits that BLM's contention that the stream fishery conditions will improve in the Sandy Area is incredibly naive, especially for a professional agency.

In addition, the Salinity Control Act (PL 93-320) calls for holding the line on reducing salinity in the Colorado River and designates the BLM as the lead agency to carry out this program. The costs of salt in the Colorado River basin to downstream users is $230,000 per mg/l. The Big Sandy River is a major contributor of salts (2.2% of the entire upper basin). The Sandy E.S. appears to attribute this to some salt springs along the Sandy River. According to a recent BLM study, salt loading is related to sediment yield and bulk of sediment yield is due to accelerated erosion caused by past and present livestock grazing practices (primarily cattle grazing) Contrary to the predicted sediment decrease from the proposed action, we believe that the change from sheep to cattle and the increased AUM's will result in increased erosion and salt loading.

Trout Unlimited is greatly disturbed by the proposed Sandy action. It is not a credible effort. It is in apparent violation of federal law and if implemented, we foresee litigation by a coalition of environmental interest groups.

Sincerely yours,

Mike Owen

Michael Owen,
President

Sandy ES -- page 2

There are several astounding statements in your ES which pertain to fencing:

--"A combination of the existing and proposed fencing would cause mortality during an average winter (63 to 76%) and drastic mortality in any winter as severe as those in 1948-49 or 1971-72(over 76%)." (p-3-55)

--"An increase in the fences and cover carrying capacity would decrease the amount of space required each year for survival. However, the 536 miles of proposed fencing would limit freedom of movement during migration and in and around crucial winter habitat. The severity of this problem would depend on the severity of winter, snow depth, and crusting conditions of snow. It is believed that the drawbacks from fencing would be serious and more than offset any increases in the carrying capacity." (p.8-143)

D) Mitigating Measures-- these measures are well-meaning but in some particular cases, are absolutely inadequate --- specifically measure # 33, which would reduce antelope injury and mortality by 3% -- I don't believe you have an adequate "feel" for the importance of the pronghorn herd in the desert.

E) It is good to see a substantial reduction in the number of "wild" horses on the desert.

I appreciate the long hours that it took to prepare this ES. However, in all honesty, The Wilderness Society respectfully requests that you abandon your office long enough to take a realistic look at the land base, the wildlife resource, and the local livestock operations. Please do us all a favor and come up with a new proposal.

Sincerely,

Bart

Bart Koehler/Regional Rep.--The Wilderness Society

July 10,1978

Mr. Richard Forsgren
Team Leader
Sandy Grazing Environmental Statement
Bureau of Land Management
Rock Springs, Wyoming

Dear Mr. Forsgren:

Will you please accept this letter as my response to the "Sandy Grazing Environmental Statement Draft." I write from the viewpoint of a concerned citizen of Wyoming who is proud of our traditionally wide open spaces, abundance of wildlife, and freedom to travel at will to hunt, fish, and to enjoy the many other outdoor activities unique to this area. I find, however, that the proposals set down by the "E.S." including all of the alternatives, have the potential for a devastating effect on our present "way of life". I feel that the BLM has not yet made any acceptable proposition to satisfy all those people involved (Game and Fish, wildlife groups, farmers, environmentalists, sportsmen, wild horse protectors, and even the livestock growers). For this reason we must not accept the proposed plan, but rather work together to find the most equitable solution for all the people.

Anybody that reads the Draft E.S. can easily surmise that the BLM and only the BLM has had any input. The public has been ignored. One has only to review comments made "for the record" from individualy representing wildlife clubs, wild horse groups, the Sierra Club, and even the livestock organizations on deaf ears.

On p. iii, under the heading of "Summary of Environmental Impacts and Adverse Environmental Effects," there are numerous adverse effects listed that far outweigh any possible reason for the implementation of the proposed plans of action. Some of those listed on that page include:"Vegetation around water developments and fences would be lost and localized soil erosion would increase."*Fences would prevent free movement of recreationists, livestock, wildlife and wild horses. Open space values would be decreased. During severe winters, deep crusted snow along fences - especially along the checkerboard boundary-- would prevent wildlife from migrating to traditional wintering areas, resulting in animal loses. Fences would also be a hazard to snowmobilers and other winter sport activities." I also feel the proposed 536 miles of fences would interfere with summer activities.

After reading the E.S. I am concerned that the welfare of the livestock industry comes foremost in importance to the BLM.

1.*Summary... , p. iii Sandy Grazing E.S.

2. Big Sandy E.S.

while wildlife seem to be a second rate luxury, and to some extent a burden. During severe drought, when the area would be under considerable stress, I provide for all the allocated AUM's . I feel certain that the further existence of wildlife and wild horses would lie in serious trouble because all concessions would probably go toward the livestock.

At first glance, when one reads in the proposals that there would be water developments throughout the area, the idea sounds great. However, under closer investigation, one finds that some of the developments would be located in critical wintering areas for wildlife (examples: just north of checkerboard extending easterly). This could have the potential for being devastating to wildlife. If water was made available in certain areas of the desert regions, wildlife might linger on these areas longer than they do at the present time, thus devouring during the summer months the values food supply normally left to grow for winter use. Livestock placed on these critical areas would also cause the same effect since they are in direct competition with elk for food. I feel that some well planned water developments in the area could prove very useful to wild horses, wild life, and the livestock if placed in non-critical winter use areas for wild life.

I agree with the plan to reduce the wild horse numbers. I feel they should be reduced to the 1971 level. In checking with the livestock managers I am sure they will most certainly agree to that number of horses. I do, however, oppose any attempt to herd them into small allotments where they can be "viewed" by those horse lovers interested in driving to remote, isolated areas where the horses would be found practically in a corral situation.

I feel that the last thing we taxpayers need is more studies such as this onest one million dollars apiece, and with no public input. If that much money and dollars would be wisely spent at improving our range for wildlife as well as for livestock, and if some limited ownership would be allowed we would all benefit tremendously. We definitely see a need for full cooperation between all departments of government involved, the public, and livestock people. No one bureau should ever have full, uncontested control over our "public land." There must always be public input and it must be heeded.

In summary, wildlife, wild horses, waterfowl, and livestock must co-exist: for their mutual benefit. Wildlife should never be placed second to livestock on public lands.

What changes the BLM has called for are too costly in appropriations necessary, in loss to all wildlife, loss in their habitat, and also loss in our own activities in this area.

3. Big Sandy ES

We treasure our wide open spaces that now have an abundance in wildlife. We don't need 536 miles of additional fences that will place additional pressures on our valuable wildlife resources. There is no price that can be placed on the asthetic value of our free roaming wildlife.

I am of the strong conviction that the interests of all those concerned could be best served if this issue be settled on a local level. I am confident that we could get all interested groups of individuals together with the departments of government and work out a common solution. What we don't need is to refer the matter to be solved in Wash. D.C. or to go through a lengthy, and costly court battle to arrive at an agreeable solution.

Sincerely,

John C. Borrea Jr.
2235 E. Teton Blvd.
Green River, Wyoming
82935

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
WYOMING STATE OFFICE
2515 WARREN AVENUE
CHEYENNE, WYOMING 82001

IN REPLY REFER TO:
E30

JUL

Mr. Dean F. Forsgren, Team Leader
Bureau of Land Management
Sandy Environmental Statement
P.O. Box 1096
Rock Springs, Wyoming 82901

Dear Mr. Forsgren:

This is in response to your request for comments on the draft environmental statement for proposed livestock grazing management in the Sandy area, Fremont, Lincoln, Sublette, and Sweetwater Counties, Wyoming.

Recreation Resources

Although we do not anticipate any conflict or use between grazing and recreational activities at Big Sandy State Recreation Area, you should be aware that area has received matching assistance from the Land and Water Conservation Fund for the development of public recreation facilities. Park and recreation areas receiving monies from the Fund are subject (in their entirety) to the provisions of Section 6(f)3 of the Land and Water Conservation Fund Act, as amended. This section of the Act requires that any change from recreational land use be approved by the Secretary of the Interior, and also requires the substitution of other properties of at least equal fair market value and reasonably equivalent usefulness and location for the recreation lands to be taken. Grazing or other ground disturbing activities could require approval for a change of use and should be reviewed in advance by the State Liaison Officer. The State Liaison Officer for Wyoming is Mr. Ian L. Wilson, Acting Director, Wyoming Recreation Commission, 604 East John Street, Cheyenne, Wyoming 82002.

Cultural and Historic Resources

The statement makes extensive references to archeological, paleontological, and historic resources in the Sandy Grazing Area. There appears to be potential for damage to those resources as a result of

Mr. Dean F. Forsgren, Rock Springs, Wyoming

the implementation of the proposed action. Impacts from trampling, fencing, and water developments are all shown to be potentially serious. For example, Table 3-25 (p. 3-105) shows that trampling impact will increase at every known archeological site in the Sandy area if the proposed management program is implemented. Tables 3-26 (p. 3-109) and 3-27 (p. 3-127) also indicate substantial impacts to historic resources.

Further, it appears that the Sandy area contains other historic and archeological sites whose significance has not been determined. Page 3-116 states that a 1976 field survey covered only 0.3 percent of the Sandy grazing area. We believe that more extensive knowledge about the area's cultural resources should be obtained and the impacts on those resources from the grazing plan analyzed in the final statement.

We urge consultation with the National Register of Historic Places and the State Historic Preservation Officer (SHPO) concerning the existence of presently known historic sites or eligible for the National Register as well as other sites that may be in the Sandy grazing area. We recommend contact with the SHPO and/or the State Archeologist to obtain their opinions as to the adequacy of our present knowledge of cultural resources in the area, and their opinions on the type and level of cultural resource survey that may be needed in the project vicinity. These opinions should be included in the final statement. If the SHPO/State Archeologist indicate that a survey is advisable, we recommend that such be undertaken by the responsible Federal agency prior to approval of the final statement, and that a full discussion of the findings of such a survey be included in the final statement.

The final statement should include a determination of the level of significance (local, state, or national) for all cultural resources now known to exist, or which may be discovered, in the study corridor. Such determinations should be undertaken in consultation with the SHPO and with appropriate local groups or individuals with historical expertise. If it is determined that any such resources meet or may meet the National Register Criteria, then the procedures of 36 CFR 800.4(a)(2) and 36 CFR 63 should be followed and reported in the final statement. If National Register quality sites will be impacted, then compliance with the requirements of 36 CFR 800 should be demonstrated in the final statement.

Mr. Dean F. Forsgren, Rock Springs, Wyoming

Natural Landmarks

Several sites in the Sandy grazing area have been highly recommended as potential National Natural Landmarks, including Killpecker Sand Dunes, Leucite Hills-Bears Tusk, Steamboat Mountain, and Oregon Buttes-Continental Peak. Checkerboard boundary ranches, trampling, and vehicular traffic may all further compromise the natural qualities of these landmarks. Consideration should be given to modifying the grazing plan in order to help preserve their natural integrity, and the final statement should discuss what measures will be taken to mitigate any adverse impacts to these areas.

Sincerely,

Robert F. Stewart

for Robert J. Pekins
Assistant Regional Director
Land Use Coordination

Box 69
Farson, Wyo. 82932
July 17, 1978

Bureau of Land Management
Rock Springs, Wyo. 82901

Dear Sirs:

I would like to enter the following statement from the Sweetwater County Farm Bureau on the Sandy Grazing District Environmental Impact Statement.

The Sweetwater County Farm Bureau wishes to go on record as being against the grazing plan offered in the Sandy Grazing District Environmental Impact Statement. We feel that the B.L.M. drew up this plan with "very little, if any, input or regard for input by the livestockmen or any of the other users. One of the main things that bothers us is the way most of the alternatives are made to look negligible and of very little consequence. It seems unjust that the alternatives are written by the same people who wrote the proposals.

I have found it impossible to thoroughly read, study and digest this huge volume in the time I've had since receiving it, and still pursue a livlihood in farming and ranching. The short extension period granted did very little to help t a situation since it is in the middle of the irrigating season and I have been unable to find time to study the proposal.

Sincerely youre,

William Lee Harms

WYOMING
STOCK GROWERS
ASSOCIATION

113 EAST 20TH STREET • P. O. BOX 306
CHEYENNE, WYOMING 82001

Area 307-638-3942; 638-3277

July 14, 1978

Survey Team
U. S. Department of Interior
Environmental Impact Statement
Sandy Grazing Area
Rock Springs, Wyoming 82901

Dear Sirs:

The Wyoming Stock Growers Association representing 2,600 operating ranchers in the State of Wyoming, would like to comment on your proposed environmental impact statement on the Sandy Grazing Area. It is the opinion of the Wyoming Stock Growers Association that the conclusions drawn by the Survey Team are of questionable advantage to the resource area under consideration. The blanket implementation of a detailed rest rotation grazing plan in an arid, semi-desert situation, where less than seven inches of rainfall is received on the average year, is of highly questionable merit in our opinion. Rest rotation systems have been proven to be of significant advantage where rainfall amounts are about twice the average of the Sandy Area. In our opinion, the blanket application of a rest rotation system on all public lands throughout the West cannot be justified. In looking through the Environmental Impact Statement it is our opinion that Alternative 4, as amended and approved by the Sandy Livestock operators, would be preferable to the Proposed Action as submitted by the Survey Team. This system does involve limited deferred grazing and provides for minimal fencing along with maximum water development. In our opinion the existing grazing systems have proven

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Page 2

adaptable and successful in the Sandy Grazing Area. We suggest that the existing grazing systems be continued with minimal changes such as fencing and rest rotation. In a semi-desert area it is the opinion of the Wyoming Stock Growers Association that the long range adaptability of this program has already proven itself. In our opinion it is imperative that the wild horse population numbers be drastically reduced, in this area, in order to provide for the existing wild game and domestic livestock populations. The forage consumption of the present wild horse population is a short-range factor which has only been present at the optimum numbers since the implementation of the National Wild Horse Act. In our opinion the wild horse numbers should be reduced to no more than the actual number present in this area as of January 1, 1971. This factor alone would allow and provide adequate forage for the existing wild life and domestic livestock populations and still conform with the general intent of the Wild Horse and Burro Act.

Additionally, the Wyoming Stock Growers Association does not feel that the Environmental Impact Statement, as proposed, does conform with a true multiple-use concept which has been approved by the livestock industry ever since the passage of the Taylor Grazing Act. The multiple-use concept is and has been flexible and will allow for increased agricultural production to meet increased human population and its demands for food and recreation. In addition, the multiple-use concept provides for the mining demands and activities which are now in evidence in southwestern Wyoming. This activity is of indeterminant duration and extent, but must be provided for to meet the energy needs of our nation. We are fearful that the Bureau of Land Management in presenting this Environmental Impact Statement exhibits a preconceived management policy for the Big Sandy Area and as a result has excluded input from other sources. It is also our feeling that the statement does not provide or regard for the private lands that are contained within the area. Our same concerns exist in regard to the state lands that are present within the area and we feel that due consideration has not been given these lands in regard to this impact statement.

Additional concerns of the Wyoming Stock Growers Association are that if this grazing plan was implemented there is the possibility that adverse

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Page 3

actions might be forced from the private land owners such as extensive fencing of private lands and/or the sale of these lands for recreational home sites. Actions such as this could be devastating to any grazing system which is forcibly applied to the area, and could change the entire future use of large sections of the Red Desert. Too often extensive resource information has been interpreted as fact and should not be projected as certain consequences of the proposed grazing system. Assertions such as these are merely assumptions and should not be stated as a verified fact some 23 years in the future. There is very little existing technical literature to quantitatively support the statements of some of these anticipated environmental impacts and future resource values, because at the present time no one knows for sure how this high desert eco-system will react to the Proposed Action and management plan for livestock. It is true that this document should be primarily an analysis of the public range land, but we feel that it is impossible to recognize the boundary between public and non-public land once the decision to implement an action is taken. This is true in regard to wildlife migration patterns, and habitat concentration areas, because the change of a livestock operator's management system, for his livestock on adjoining public lands, frequently can intensify his management problems in regard to his private lands. This is true, not only in regard to domestic livestock, but also in regard to AUM's of use for wildlife and wild horses.

We object to the thrust of the Environmental Impact Statement draft which directly implies positive results from the proposed grazing system without respect to the effects which change may bring about over a long period of time to all resource values within the area. We are also critical of the fact that nearly a million dollars of taxpayers money has been spent to produce the final Environmental Impact Statement draft which to us represents an unnecessary and exorbitant waste of public funds. How much better it would have been had the one million dollars been used for range improvement in the Sandy Area which would have benefited all livestock and wildlife uses.

In conclusion, it is our opinion that the socioeconomic analysis portion of this draft statement is glaringly insufficient. The lack of regard

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for the real potential socioeconomic effects of the Proposed Action on the local economy and livestock industry are glaringly abusive. It is for these reasons that the Wyoming Stock Growers Association wishes to register strong opposition to the Proposed Action as outlined by the Environmental Impact Statement. We suggest that the Bureau of Land Management meet with the livestock operators in the Sandy Grazing Area and work out a grazing system more nearly attuned to Alternative 4 which was originally submitted by the operators. We are not endorsing Alternative 4 as it appears in the Impact Statement, but merely saying that this alternative with certain changes and amendments, as approved by the operators themselves, is a more viable and realistic approach to the overall grazing management of the Sandy Area than is the Proposed Action.

We thank you for the opportunity to submit our comments in regard to this final draft of the Sandy Grazing Environmental Statement and are hopeful that because of the almost universal opposition by all multiple users that the Bureau of Land Management will again meet and review with the existing user groups to create a more acceptable future management system for the Sandy Grazing Area.

Sincerely,

Dean T. Prosser, Jr.
Executive Vice-President
WYOMING STOCK GROWERS ASSOCIATION

DTP:ps

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D-BLM-J99006-Wy

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80203

JUL 14 1978

Ref: 8W-EE

Mr. Dean F. Forsgren
Bureau of Land Management
Sandy Environmental Statement
P.O. Box 1869
Rock Springs, Wyoming

Dear Mr. Forsgren:

The Environmental Protection Agency has reviewed the Sandy Grazing Draft Environmental Statement and would like to offer the following comments for your consideration.

The need for an integrated approach to salinity control programs requires planning to coordinate and promote actions that will mitigate excessive saline discharges into the streams within the study area. Such controls could be done through:

* Direct action by the state engineer to limit or control the amount of water diverted. This measure may be used to eliminate usage of those streams which have low salinity in favor of preferential use of streams with a high total of dissolved solids. Such utilization of low quality water would allow a higher quality of water to remain instream.

* The restriction or limitation through land use controls on grazing intensity along highly erodible streams should be emphasized to reduce salinity from runoff. Livestock pressures should be mitigated in areas which lack deep-rooted vegetation, until bank stabilization has become effective.

* There should be minimum standards for water well construction to include casing requirements that will provide protection from surface contamination and protection from contamination as a result of interconnecting aquifers of differing quality The plugging of abandoned wells and exploratory drill holes to avoid contamination of groundwater should be done.

* Eutrophication problems have been observed in Flaming Gorge Reservoir which is downstream from the study area. It would be appropriate to discuss changes in nutrient transport due to the proposed action and the above recommendations.

Page 2 - Mr. Dean Foregren

Throughout the text, it is an assumption that instream salinity levels are proportional to sediment runoff (see pages 3-16). The Southwestern Wyoming 208 study concluded that the salinity contribution from groundwater inflow into streams was quite significant in certain areas of this region. Therefore, the conclusion that salinity will decrease proportionately with decreasing runoff may be incorrect in certain watersheds.

The draft environmental impact statement adequately sets forth the proposed project goals. Based on procedures adopted by EPA to rate an EIS, the Sandy Grazing draft Environmental Impact Statement will be listed in the Federal Register in Category LO-2. This means EPA has no objections to this proposal as described in the draft impact statement and suggests only minor changes to be addressed in the final EIS.

We would like to thank you for the opportunity to make comments on the draft EIS. If we may be of further service please contact us.

Sincerely yours,

Alan Merson
Regional Administrator

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Dean F. Foregren, BLM, Sandy RS Team Leader, P.O. Box 1869, Rock Springs, WY 82901

DATE: July 14, 1978

FROM : Acting Area Manager, USFWS, Billings, MT (RS)

SUBJECT: Review of Draft Sandy Grazing Environmental Statement (EC/78/22)

We have reviewed the Draft Sandy Grazing Environmental Statement. The following constitute the comments of the U.S. Fish and Wildlife Service.

GENERAL

Fencing

One of the range improvements included in the recommended alternative is construction of 536 miles of fence necessary to implement the proposed grazing program. A real possibility exists that this extensive amount of fencing could create extreme fluctuations in antelope populations in the Sandy Area. You did, of course, address this impact. However, we were unable to find explicit reasons why the extensive amount of fencing was chosen in lieu of lesser amounts contained in some of the other alternatives. Since such a large impact to antelope could occur, we feel the reasons behind the selection process should be documented. Put another way, why are increased forage production and increased livestock grazing (made possible by fencing and intensive management) worth more than stable antelope populations?

An attempt has been made to mitigate the consequences of extensive fencing by proposing three strand instead of four strand fences in some locations. Were let-down fences also considered as a mitigative measure in some areas?

Wet Meadow Vegetation Subtype

Closely allied with the wet meadow vegetation subtype is the riparian habitat. Because of this close association, they have been lumped together in the DEIS as the wet meadow vegetation type. Together these two types provide much of the critical habitat for large wildlife ungulates and for the successful rearing of young sage grouse and the progeny of numerous other wildlife species. As in most areas of the semiarid west, this habitat is in short supply. The Sandy Area is no exception since this type represents only about 1.9 percent of the total land area.

The scarcity of this type and its importance to wildlife warrant special protective measures to insure that sufficient amounts remain to support

healthy wildlife populations. Therefore, we note with approval the mitigation proposals to fence water developments and riparian communities in the Sandy Area. However, it appears to us that most of the riparian areas to be fenced are in the northern portion of the Sandy Area where aquatic habitats capable of supporting a fishery exist. Riparian habitats elsewhere in the Sandy Area, while not important from a fishery standpoint, are important to a myriad of game and nongame terrestrial species, and, in many cases, are critical to the existence of these species. In view of the fact that the proposed change in livestock use (sheep to cattle and more intensive management) is generally projected to degrade the riparian systems (see page 3-73, 2nd column, 6th paragraph), in some cases accelerating erosion by as much as 1,362 percent (see table 3-43), couldn't more attention be given in the mitigation proposals to additional and more widely distributed riparian protection? For example, the Cold Creek, White Horn, and Prospect Mountain allotments comprise about 212,128 acres in the northern portion of the Sandy Area. Within that area are 18 of the 26 stream-miles proposed to be fenced under the mitigation proposals. However, the Little Colorado and Pacific Creek allotments comprise 929,812 acres, yet only 8 miles of stream are to be protected in these areas. Similarly, inasmuch as the wet meadow vegetation comprises less than two percent of the entire Sandy Area, shouldn't surveys have been made to determine which of these meadows were most productive of wildlife? Measures could then have been presented in the mitigation chapter of the statement that would protect some portions of the most important meadows.

Regarding the fences to be used to protect water developments and the riparian habitats, we have the following questions and recommendation, since your intentions and expectations are not clear from the statement:

(1) Are 3 strand fences sufficient, without constant maintenance, to keep cattle out of water developments and the riparian system? We note that the fence in the photograph on page 1-26, illustrating a typical spring development, has at least 6 strands of wire. In this semi arid country, are cattle not notoriously "herd" on fences surrounding water?

(2) The effects of cattle and/or high stream runoff make fences extremely difficult to maintain in riparian areas. Are there factors in the Sandy Area that preclude fence damage during floods, and if not, what special considerations will be undertaken to maintain these fences?

Because of the presumed difficulty in maintaining fences in riparian and meadow areas, other mitigation methologies could have been examined in the DEIS to protect these areas. One apparent methodology might be the use of a 3, or even 4 pasture grazing system in allotments scattered throughout the Sandy Area. The longer rest periods of 2 or 3 years might alleviate many of the problems in the riparian areas. We did not identify consideration of this mitigation alternative in the DEIS.

Forage Allocation

Table 1-8 summarizes the management objectives of the proposed action. For allotments in the Sandy Area, these objectives are to increase forage production for livestock, but for wildlife the objectives are only to maintain the forage for existing or slightly increased numbers of wildlife. On page 301, 2nd column, 4th paragraph, it is stated, "All increased forage production in the long term will be allocated to and used by livestock." The reasons some of the increased forage were not set aside to enhance survival of antelope in severe winters should be discussed. Such an allocation would tend to compensate for some of the losses resulting from the proposed fencing.

Basic Data

We would not question the technique or methodology behind the 1964-65 ocular reconnaissance range survey; however, we do question the use of 14 year old data for preparing an EIS setting out management guidelines for 1,000,000 acres of land. Was any supplementary sampling done, even small scale, to determine if range conditions have changed in the intervening 14 years? Some discussion of this appears warranted in the statement.

SPECIFIC

Page 2-96, 2nd column, paragraph 6 The sentence, "The bald eagles appear to be the northern subspecies which are being nominated for inclusion on the endangered species list," should be reworded as follows: "Bald eagles, which are also present in the area, have been listed as endangered species in Wyoming." This change was listed in the Federal Register, February 14, 1978, Vol. 43, No. 31, and became effective March 16, 1978.

We appreciate the opportunity to comment on the Draft Sandy Grazing Environmental Statement.

cc: FWS/ES/EC Washington D.C.
Regional Director, USFWS, Denver, CO (ENV)

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Box 47
Farson, Wyo. 82932
July 17, 1978

Bureau of Land Management
Rock Springs, Wyo.

Dear Sirs:

As the licensee of the Flat Creek allotment I am hereby entering an objection to the proposed AMP for this allotment I fear that if it is alternately grazed it will cause much more impact, especially in the areas where the cattle water. Flat Creek itself suffers from this problem now and, if used for an entire season, I think the damage would be far greater than it is presently.

It is my opinion that what is needed most is water development in the form of reservoirs and perhaps wells or spring development on the higher benches to relieve the concentrated grazing on the creek bottoms.

I feel that if the grazing problems had been discussed with me, a better understanding could have been arrived at. That is, a plan agreeable with both you and I.

Sincerely yours,

John T. Hadsenville

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There is very little existing technical literature to quantitatively support the statements of anticipated environmental impacts and future resource values under the Proposed Action and some of the alternatives. At the present time, we in the Profession of Rangeland Management do not know how this high desert ecosystem will react to Proposed Action types of intensive management of livestock.

C. The existing draft does not address the potential environmental effects on non-public rangeland resource areas, should the Proposed Action or Alternatives be implimented. While it is true that this document should primarily be an analysis of public rangelands, mother nature will not recognize the boundaries between public and non-public lands after the decision to impliment an action is taken. Management decisions made on public lands can drastically affect potential management levels on non-public lands. For example, wildlife migration patterns and critical habitat concentration areas are often keyed to non-public land areas such as stream bottoms and/or cultivated pastures, most of which are non-public land in the Sandy Area. If a livestock operator is forced to change the management of his private lands to a more intensive level in response to a BLM intensive livestock grazing system on adjoining public lands, then the total number and season of use for wildlife AUMS available on his private lands may change, to the detriment of the species.

D. Through-out the EIS draft, the narrative is written in a manner which directly implies a "positive" Proposed Action and "negative" Alternatives with respect to livestock grazing management effects on resource values of the Sandy Area. At the present time, the document is, in effect, a three quarter million dollar brochure to "sell" the Proposed Action to the general public, most of whom are technically uninformed of the real facts, or as is often the case, of the lack of them. We do not have Alternatives which have been presented in an objective manner. They do not "stand alone" in their environmental evaluations, but rather are constantly "bench-marked" against the Proposed Action. Alternatives should not be "compared" to a Proposed Action in the document. They should be "comparable" to the reader

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OLD WEST GRAZING E.I.S.
MONITORING PROJECT
RICHARD -DICK- LOPER
RANGELAND SPECIALIST
P.O. BOX 1029
LANDER, WYOMING 82520

July 17, 1978

To: Mr. Dean Foregren, Sandy EIS Team Leader,
Rock Springs BLM District, Wyoming
From: Dick Loper, Rangeland Specialist
Re: Project Comments on the Sandy Grazing EIS Draft

In my opinion, the Sandy Grazing EIS Draft, as presently written, does not comply with the legislative intent of the National Environmental Policy Act (NEPA) and/or the terms of the 1973 out-of-court settlement between BLM and the Natural Resources Defense Council (NRDC), and others. In general, I do not believe that this is due to the lack of honest effort or Professionalism on the part of the technical staff that participated in its preparation. Given the existing situation of BLM and Department of Interior constraints on effective public participation in preplanning stages of EIS's, manuel instructions that often are too inflexible to the local situation, and time consuming administrative rewrite requirements, the responsibility for this EIS being inadequate lies wrapped in bureaucratic red tape, not with the field men who supposedly write the initial narrative.

Reasons for Inadequacy

A. This statement draft fails to set forth any rationale to support the Proposed Action of intensive management recommendations on 98% of the Sandy EIS Area.

B. The existing data base and multiple resource information is not technically adequate to support the degree of definitive narrative statements, graphs, charts, and maps presently in the document. Too often, extensive resource information has been interpreted as fact. Extentions of existing information into statements of future environments and environmental consequences are presented as "this is what will happen under these facts", when it would be more appropriate to state, "this is what we think will happen under these assumptions".

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from an overview perspective. At the present time, it would be very difficult for BLM to justify choosing anything but the Proposed Action, because the Alternatives look so bad in comparison to the Proposed Action.

E. Alternatives do not represent an adequate set of options to the Proposed Action.

Alternative 1: Continuation of present use (no action) - The continuation of the present livestock grazing use cannot be considered a "no action" situation, but rather a "no change in the present livestock management" situation. A "no action" description on this Alternative places a negative implication on the present situation when in fact, a lot of proper rangeland management is presently taking place due to cooperative efforts between BLM, livestock users, and other users of the Sandy Area.

Alternative 2: Discontinuation of domestic livestock grazing - Practically and technically speaking, this is not a reasonable or feasible Alternative from local economic or rangeland management points of view. At the present time, livestock grazing is the only effective and controllable tool we have to use in order to manage the rangelands. Many native plants become decadent and less vigor if they are not grazed in a proper fashion. This Alternative ignores the potential adverse effects to multiple resources which may occur specifically from the lack of old growth removal on some plant species.

Alternative 3: Allow conversions without fences - This Alternative is not an appropriate Alternative to the Proposed Action because it does not address a change in grazing intensity. It addresses the effects of allowing the livestock operators request for conversion from sheep use to cattle use, but without the fences recommended in the Proposed Action. My objection to this Alternative, as written, is not that these environmental affects should not be evaluated and analyzed, but that allowing conversions without fences is, in itself, not a major Alternative to the Proposed Action, and therefore does not deserve

major Alternative status.

Alternative 4: Livestock grazing program as proposed by the Sandy livestock operators - This Alternative, as presently written in the draft, has been publically disclaimed by the Sandy livestock operators as not representing their written proposals, originally submitted to BLM in the fall of 1976. The operators are rewriting this Alternative during the public comment period. This rewritten narrative will be turned in to BLM as a written comment and will factually reflect their proposals.

Alternative 5: Reductions of grazing capacities on allotments with excessive soil erosion and poor range condition for livestock - At face value, this Alternative is a proper Alternative to the Proposed Action because it addresses the effects of a level of livestock grazing intensity on the rangeland resource. However, the stated environmental effects presented in this Alternative are subject to a qualitative evaluation because BLM states in Chapter 2, Description of the Environment, that they (BLM) presently do not have an acceptable evaluation of the specific locations of range sites, and reliable rangeland condition and trend data for much of the Sandy Area. Without reliable condition and trend data, it would be very difficult to properly locate existing manageable areas which need reductions in livestock grazing capacity and virtually impossible (and improper) to attempt a high level of quantification of the future resource environment if changes in the present livestock management situation are implimented.

Alternative 6: Site - Specific recommendations - While the title for this Alternative sounds great, the narrative does not address rangeland "site - specific" areas. This Alternative proposes to manage over 1,180,000 acres of the Sandy Area (60% of the total acreage) in a more intensive manner than does the Proposed Action!! "Treatment B (graze until seedripe, then rest) would replace Treatment A (graze season long) in the 3-pasture rest-rotation systems proposed (in the Proposed Action)

(my parenthesis) for pastures with critical (wildlife) winter habitat." "Grazing systems for the other allotments would be the same as stated in the Proposed Action (Table 1 - 4). Management and use levels stated in the Proposed Action would be the same for this Alternative; only the amount of time livestock would be grazed in the pastures would change." (P. 8 - 134 & 135, Sandy EIS Draft). This Alternative affects six of the sixteen Allotments in the Sandy Area. Is it reasonable to even suggest that number 6 is really a major "Alternative" to the Proposed Action? Alternative 6 is the Proposed Action, with a technical adjustment which probably will not significantly effect the quantity and quality of most multiple resource values when the environmental trade-offs are objectively summarized.

F. It has been very difficult to correctly interprat many of the tables, maps, and narrative statements due to inconsistancies, varying scales, and incorrect keys and footnotes.

G. The socio-economic analysis phases of this draft are deficient and/or non-existant. It's difficult to believe that all of the Allotment benefit-cost ratios in the Proposed Action are positive, but we have almost no way to determine how these B/C ratios were computed. An allotment example would have helped show the procedures and values used to get the stated ratios.

The lack of regard for and considerations of the real potential socio-economic effects of the Proposed Action and Alternatives on the local economy and livestock industry are a disgrace. Many statements made on pages 3 - 110 through 3 - 121 in the chapter on Impacts of the Proposal, Socioeconomic conditions, are misleading and even false at times. Contrary to how this section is stated, a management decision to impliment the Proposed Action or the majority of the Alternatives, as written, has the potential to create economic and sociologic havoc with some users of the Sandy Area.

H. This draft is deficient in the Appendix, especially in specific examples which would show the reader how basic resource information

from the field was used to build statements and tables of environmental impacts such as present and future AUM's by species, range condition and trend, wildlife population increases or decreases, etc., etc.

Specific Comments

1. Pg. iii

A. Item 2, - Is it economically or technically feasible to expect BLM to be able to implement such a Proposal within 8 years, given the existing atmosphere in Congress on budgeting, and the sociological situation in the Rock Springs area?

a) Recommend setting up exemple study areas in Sandy area on pilot basis in order to gather data on technical and economic ramifications of Proposed Action type management plans.

b) Evaluate local support for Proposed Action activities to evaluate potential for success if Proposed Action implemented.

B. Item 2, line 1, - Will Purposes also be BLM Goals of management?

C. Item 3, line 3, - Rest after seedripe, Treatment B, does not provide for increased forage production on the rangelands; only less removal of old growth current year's production.

line 6, - Beneficial is a qualitative term, and it is incorrect to state that all wildlife will benefit from complete rest from livestock grazing of a particular area.

line 6, - There is no literature available at the present time to substantiate the statement that "the systems would improve vegetation production and wildlife habitat, and increase livestock weight gains over time.", and it is improper and misleading for BLM to make statements such as this when they can not be proven.

line 8, - The entire sentence on the effects of Treatment A is an overstatement of the adverse effects of livestock season - long grazing on the resource. The statement is incorrect as written.

line 12, - Livestock operator AUMs do not have to be reduced Sandy Area wide, to achieve proper stocking rates. Across the board reductions have never been a proper rangeland management tool in the past; they are not a proper tool now. Only site specific evaluations can indicate where and the amounts of cuts necessary to help achieve a management goal.

line 14, - Since the range management Profession does not really know how the resource will respond to Proposed Action management, vegetation increases "obtained" by BLM may not occur.

line 16, - Why would vegetation production be reduced over the short term due to initial grazing pressure, when fewer AUMs will be allowed? Proper stocking rates will not cause reduced forage production to occur.

line 17, - Vegetation production would increase, or is hoped will increase??

line 18, - Vegetation is not lost around developments, it is removed by grazing animals.

line 19, - Increased competition will not occur with all wildlife species on all areas.

line 20, - Increased operator maintenance cost is not an environmental effect, and this statement does not belong in this section.

line 21, - A change in livestock use patterns is not necessarily an adverse environmental impact on the resource.

D. Item 5 - While technically speaking, the groups listed here were informed that an EIS was being prepared, it cannot be stated that a proper dialogue between BLM and these groups was allowed. The document is a BLM produced document, prepared without the proper amount of public participation.

2. Pg. 1 - 1

A. Bottom sentence in 3rd paragraph - It is a BLM determination that a large scale fencing program is necessary for effective cattle control; no one else's. Livestock can often be effectively controlled using other management tools, such as water control, herding, etc.

B. First sentence, 4th paragraph - It is not and has not been a BLM State or National Policy to disallow conversion requests until the EIS for an area is completed. Many BLM Districts evaluate the potential environmental impacts of such requests by writing an Environmental Assessment Record, (EAR). The decision to not allow the request in the Rock Springs District has been a District decision, and can not be attributed to any other authority.

3. Pg. 1 - 3

A. Line 9 - The word "optimum" needs defining as used here. "Optimum" for whom? The AUM numbers being stated in this paragraph should be stated as "goals of management", not what will be the situation in 23 years.

B. First sentence, 4th paragraph - "Improved" management is an incorrect term. Change "improved" to "intensive" throughout the draft. Wherever the word improved is used to describe a livestock management system, it should be changed to intensive.

C. Paragraph 5, 2nd sentence - Custodial management is not the typical situation in the Sandy today. To say so is a reflection of ignorance of the present situation, and Chapter 2 of this draft proves it.

D. Item 3, top of right column - should read "No livestock grazing...", not "No grazing...".

E. Last paragraph, right column - It is technically improper to even consider reducing or increasing the current level of AUMs allocated to a grazing use until an acceptable range condition and trend evaluation is available. An acceptable range condition and trend survey and resource monitoring program is not now available for the Sandy.
If the evaluation of the resource indicates an overstocked situation, all grazing uses of the resource should have to share in the reduction efforts to improve the existing situation. When increases are justified (from an evaluation of trend data), all grazing uses should share in the increases allowed.
It is incorrect to base the initial carrying capacities of different grazing uses (livestock and wildlife) on different sets of criteria and inventory information. It is incorrect to base livestock carrying capacities on a 1961-65 ocular reconnaissance rangeland survey, and wildlife carrying capacities on total desired, or even currently present. The forage production of the resource should and must be the only basis for AUM allocation between legitimate grazing uses of the public lands or any other rangelands. To use any other criteria is not resource management.

F. First paragraph, left column - Appendix 13 is presently deficient. It should show the AUMs available for wildlife at the time of the 1961-65 rangeland c. r. survey, the present population levels, and the wildlife species AUM needs, so comparisons can be made.

G. Second paragraph - Wild horse forage reservations should only be made in areas where wild horses will be.
Boundary changes do not "have" to be made by BLM to get the proper allocations in those areas because "uniform" operator reductions in use, is not a desirable procedure. Reserve forage where it is needed.

H. Sixth paragraph - Table 1 - 5 is not realistic. It should be reconstructed to read:
with the cooperation of livestock operator, review the present situation and after consideration of all technically and economically feasible alternatives designed to promote proper rangeland and operational management, decide

on proper grazing system needed, projects needed, and tentative timetable for implementing AMP.
year 1 - initiate range condition and trend studies to evaluate resource.
year 2 - evaluate studies and start phased reductions or increases justified by initial apparent trend data.
- start construction of needed projects with a priority based on needs of the resource, not on a grazing use.
year 3-6 - continue trend evaluations.
- continue project construction.
- with assistance and cooperation of livestock operator, determine appropriate timetable for implementing the grazing system.

I. Left column, 7th paragraph - This paragraph should include a statement to reflect the advisory roll played by the District Grazing Advisory Board in setting priorities on AMPs and projects.

J. Right column, 7th paragraph - This paragraph accurately states the important items to consider when choosing a grazing system. Note that it includes the "objectives of the operator". The operator, as used here, does not mean the BLM operator, but the livestock operator.

K. Right column, last paragraph - These studies were not conducted on Sandy Area Ecosystem types, and it is inappropriate to cite them here in order to state that the same resource responses will occur. We don't know if the responses will be the same or not.

4. Pg. 1 - 11

A. Line 21, right column - How is it possible to design "a" rotation system (singular) for 90% of the Sandy Area, when in the paragraph just above this statement, Stoddard, Smith, and Dix are quoted as writing that "proper deferred - rotation and rest - rotation schemes (plural) offer the range manager important tools ...". The Sandy area contains a variety of rangelands. It is doubtful

that one system is "best" for all of them.

5. Pg. 1 - 15

A. Table 1 - 10 - Bluebunch Wheatgrass may not be the best plant to use as a "key" species in all of these allotments. Plants considered more preferred by livestock might be better "key" species plants. such as Indian Ricegrass, or Green Needlegrass.

- It is also doubtful that a significant enough change in Big Sagebrush can be detected for it to serve as a "key" species. Big Sage is considered by BLM to be a super-abundant species in much of the Sandy. A super-abundant species should not be a "key" species in technical evaluations of rangelands.

- Western and Thickspike Wheatgrasses usually respond more often to the growing season then to the effects of livestock grazing.

6. Pg. 1 - 17

A. Upper left column - The key to proper rangeland management is not in the results expected from a certain kind of system, or the seasonal maximization of the forage, but rather is in finding the proper overall grazing conditions which will provide a sustained multiple use of the total resource in optimum fashion.

B. Left column, 3rd paragraph - The size of the concentration areas around water holes and other areas is largely a function of stocking rates and grazing distribution patterns, and can not be controlled by just periodic rest. A combination of rest or deferment and proper distribution is necessary in order to maintain adequate plant composition and vigor in these areas.

- One of the more important concepts to remember in designing a rest - rotation system is flexibility during periods of resource stress. The more fragile the ecosystem, the more flexibility the system should have. A rest - rotation system with the minimum possible pastures (3) is not a flexible system. In general, rest - rotation plans on very dry rangeland ecosystems contain more pastures than the minimum possible in order to protect the

resource and the grazing user.

7. Pg. 1 - 19

A. Third paragraph under Custodial Management heading - Trend studies should be read yearly to get proper indications of vegetation trends. Rangeland improvements should be based on the needs of the resource, not on a management strategy.

- What kind of "analysis" will BLM perform on projects proposed by the operator?

B. Last paragraph, right column - A management objective for all rangelands, whether they be BLM custodial areas, large government blocked lands, or privately owned, should be proper rangeland management.

8. Pg. 1 - 21

A. Second paragraph, right column - Why not enclose the spring overflow with livestock-tight fencing, install a water spreading device within the enclosure, plant upland game and/or small mammal forage plants, and develop these areas into mini-wildlife sanctuaries? This would help mitigate the adverse environmental effects of livestock, horse, and big game concentrations around water developments.

9. Pg. 1 - 30

A. Second paragraph below Reservoirs heading - The average size of proposed reservoirs is not a useful figure. A minimum - maximum size range in values would be more useful information to the reader.

10. Pg. 1 - 36

A. Second paragraph under Interrelationships - The draft states that a 4th order soil survey is the basis for subsequent determinations of range site locations and size. The exact location and size of a range site can not be technically determined using a soil survey of the 4th order. Table P1 - P, page A - 36 (Appendix) lists "Range sites" with their corresponding soil types. The

terms shown, (examples: sagebrush - grass, conifer, etc) are not range sites under Soil Conservation Service (SCS) definitions. They are BLM Range "types". There is no such thing as a Range "site" BLM or SCS. The attempt to classify BLM Range types into SCS Range sites is improper from a technical point of view. The attempt to use an extensive inventory data base source of information to build an intensive set of AUM tables, range conditions, trends, etc., creates a shadow of doubt with respect to the level of reliability for data presented in tables, maps, charts, and narrative statements.

- Although not obvious by reading the draft, BLM is using a different definition of range "condition" than the standard one developed by the SCS. BLM should include a narrative statement to explain these differences so that data on condition and trend can be placed in its proper perspective by the reader.

B. First paragraph under Wildlife, right column - The statement "Grazing systems designed to increase livestock use would lead to reduced numbers of wildlife," is inaccurate, very misleading, and represents a narrow-minded, uneducated point of view. A basic philosophy in the Profession of Rangeland Management is that livestock are one of the few manageable tools we have in order to manage the resource for improved multiple use benefits. A properly designed grazing system will provide forage for all grazing uses. A system properly designed to increase livestock use must also be increasing forage availability and/or quantity on the land. Many wildlife species will also benefit from this improved situation.

- The statement "Any fences built in the area will cause animal mortality;..." is also inaccurate, and very misleading. This statement should be changed to read "The amount of fencing proposed in the Proposed Action will cause some animal mortality;...".

11. Pg. 1 - 38

A. Upper left column - Rewrite to state that "The goals of implementation the AMPs are (1), (2), (3), (4). No one knows for a fact if the AMPs would do (4) through (1).

B. Item 2 under Watershed, left column - Is a low intensity soil survey an adequate base for planning?

C. Item 1, under Wildlife, left column - If the word rangeland is used here as a synonym for livestock, then it is incorrect to do so. Either change the sentence to read "acceptable livestock management", or "proper rangeland management", the latter being preferrable.

D. Last sentence, under Relationship to the Proposal, top right column - Wildlife population levels "desired" by whom?

E. Right column, Cultural, Relationship to the Proposal - Strike "The Proposed Plan has been kept low key ...", because this isn't true. The Proposed Plan can not be considered "low keyed".

F. Right column, Lands - Insert statement to conduct R&R on any proposal to stop grazing on BLM withdrawn lands, and strike last sentence which reads, "This would place more demand ... forage", because it is misleading. The resource can not be "demanded" to produce more forage. A forage resource only has as much potential to produce AUMs. Increasing the demand for AUMs does not in itself release an increased forage production response by the resource.

12. Pg. 1 - 39

A. Item 5, Recreation - Reword to state "Livestock grazing effects will be mitigated in recreation areas where problems exist.

B. Relationship to the Proposal, Recreation, left column - The 11 items listed just prior to this section, if allowed to happen, will present conflicts with the grazing management plan in the Proposed Action. How can this section state that the "Proposed Action has been held at a low level so recreation plans can be developed without creating conflicts..."?

C. Under U.S. Forest Service - Why hasn't the possibility of coordinated resource plans between BLM, USFS, and private owners been addressed in this draft?

13. Pg. 1 - 10

A. Under Wyoming Game and Fish Department - Insert statement that BLM reserved forage based on the desired population levels of wildlife, not the existing populations. The Proposed Action reserves forage AUMs for wildlife not even born yet. Why?

14. Pg. 2 - 3

A. Soils - The soils section is well done, and deserves recognition to that effect. The statement that "this survey (Level 1) cannot be a substitute for a series level survey", is correctly stated. Other sections of the EIS should have paid more attention to this statement.

15. Pg. 2 - 12

A. Surface Disturbance, right column - The use of the Nuempfer Formula as it is presented in the cited literature, is inapropos. Nuempfer developed his formula in Montana mountain foothills country, not desert rangelands. He specifically states in the 1965 article sited by BLM in this draft, that his curves and equations are only applicable to Northern Rocky Mountain foothill areas where stocking rates are in the 2 - 4 AUM/M category. While the same general relationship may hold true between the two ecosystems, the use of the mountain equation coefficients is not proper in view of the fact that the data presented in the draft has been presented as facts, not as assumptions or best guesses based on existing information. Recommend BLM qualify the data to reflect its' potential deficiencies.

B. Soil Compaction, 1st sentence - This statement is presented out of context. Some compaction in light textured soils will increase seed germination of some native species. The statements by Cox are taken from a reference on Wisconsin rangeland in the Black Hills, not representative of native bunchgrass - sage areas. Most bluegrass rangelands are back east, or midwest, in heavier soils than are here. Why can't BLM cite soil studies conducted in the west somewhere? They would be more likely to represent our situation.

C. Bottom of page, last sentence - The word "destroys" is not a correct term to use here. Proper grazing doesn't destroy anything in the resource.

16. Pg. 2 - 15

A. Second paragraph, left column - These groupings shown here should not be applied to the entire Sandy area. Each ecosystem in the Sandy should be rated on its own. The moderate stocking rate shown here might be moderate for a foothills area, but would probably be heavy or severe on a desert flat area.

17. Pg. 2 - 63

A. Upper left column - The factual statement made here, that condition was determined for wildlife on each range site, is misleading because: (1) exact locations for specific range sites are not known,
(2) each range "site" was not visited and evaluated by a BLM person,
(3) data was collected on a certain number of transects and extrapolated to include the entire Sandy area,
(4) there is no such thing as range "condition" by animal species. The condition of a range site is it's view as, composition compared to ecological climax for that site.

B. Apparent Trend - The value to the resource manager of the apparent trend evaluation shown by BLM for each animal species is overstated because trend is trend in rangeland condition. If condition by animal species is subject to question (see comments on condition, above), then trend by animal species is also subject to a questionable statement. BLM should state the level of apparent trend sampling that was performed.

18. Pg. 2 - 82

A. Line 4, upper left column - "Pronghorn have diet overlap with livestock grazing" and line 16, same paragraph, "cattle and horses have little diet overlap with antelope" seem to conflict, or at least confuse the reader.

19. Pg. 2 - 104

A. Last paragraph before Little Colorado Allotment heading - This paragraph is an example of a problem occurring throughout this draft. Chapter 2 is supposed to be a description of the existing environment, but this paragraph describes the stream conditions within proposed allotments. BLM seems to often confuse the present situation with the proposed situation. Are they really the same, or a Freudian slip?
- Why is the evaluation of a watershed condition based on man-made allotment boundaries instead of natural watershed divisions?

20. Pg. 2 - 150

A. Under Livestock Grazing - The vegetative resources and other multiple uses may receive benefits from non-use taken for any reason. Why does non-use for protection and conservation of the resource have to be the only legitimate reason?

21. Pg. 3 - 1

A. Item 5, upper right column - When increases in forage production are made available for grazing, all legitimate grazing uses should share in their distribution.

22. Pg. 3 - 21

A. Under Vegetation - The sited studies are not applicable to the Sandy area, and should not be used in the way they have been in this draft.

23. Pg. 3 - 22

A. Second paragraph, left column - It is doubtful that a trend can

be evaluated in these allotments if Nip Here is the key species, and only receives 15 - 20% utilization.

B. Third paragraph, left column - The way this paragraph is written, it casts a negative implication on increased forage species. This is inappropriate to do, and tends to make treatment A look worse than it may be.

C. Lower right column - The combinations of Treatments (A),(B),(C), and (C) into three pasture rest - rotation systems will not provide the optimum situation for the resource. In desert habitats, rest - rotation systems designed with 3 - 5 pastures, have a better chance for success than those with three pastures. It is questionable whether or not rest - rotation is even a proper technical tool for use in management of dry desert rangelands.

24. Pg. 3 - 23

A. Third paragraph, left column - If all grazing systems show improved perennial grass response, is it worth the risks to the resource and livestock industry to impose intensive rest - rotation systems on the Sandy area?

25. Pg. 3 - 114

A. Under Livestock Grazing, Assumption - This rigid BLM policy of not allowing non-use except for the reason of conservation and protection of the resource will not be beneficial to the resource.

B. Under Grazing Treatments, right column - Paragraph discussing Treatment A states that "holding livestock in one pasture would force them to spread out over the pasture, utilizing lightly grazed steeper slopes and less preferred forage". It is known this will happen, but Nuempfer's study, earlier sited by BLM, states that livestock will not necessarily move out over the rougher ground if confined in a single pasture, but instead will increase the utilization of forage plants in areas of existing concentrations. Forcing cattle to stay in one pasture is not the

spawn to better distribution. Management tools such as salting, water controls, and herding, are much more effective towards that goal.

C. Under Treatment B, right column - As the season progresses, livestock may be only maintaining or even losing weight in the latest grazing season. Add "even losing weight" to existing narrative.

26. Pg. 3 - 118

A. Under Summary of Impacts - This statement is presented as what will happen, as factual. We do not know if these results will occur under the Proposed Action. This statement needs to be qualified, using modifying language which describes the possible results of the Proposed Action.

27. Pg. 3 - 1

A. Paragraph h, left column - Why has BLM assumed that the existing custodial pastures will continue to be managed under the present situation?

B. Under Alternative 1, 2nd paragraph - If the level of use by livestock will be reduced under this alternative to reflect reservations for wildlife, etc., can this Alternative be called a "no action" Alternative?

- The second sentence in this paragraph compares this alternative to the Proposed Action. This is improper to do in this chapter. To always compare the Alternative to the Proposed Action tends to cast a negative implication on the alternative. This is a major problem throughout the Sandy RIS draft.

28. Pg. 3 - 5

A. Top of left column - Statements are examples of negative comparisons to Proposed Action.

B. Last paragraph before Analysis of Alternative 1 Impacts - Why does

the maintenance of rangeland improvement projects have to continue at the present level in this alternative? Why can't the level be increased to reflect the existing need? Part of this alternative proposes changes, and part proposes no changes. This is confusing if this is a "no action" alternative.

29. Pg. 3 - 16

A. Right column, 3rd paragraph - The livestock stocking rates in Gold Creek, Steamboat Mountain, Little Colorado, Red Desert, Bunk Rim, and Sands Allotments are not now considered heavy. The last sentence in this paragraph is incorrect to state that "Production will go down in these allotments because of continuous heavy grazing ...". This sentence misrepresents the existing situation.

30. Pg. 3 - 29

A. Alternative 2 - This alternative is an exercise in futility because it is not an economically or technically feasible alternative for the Sandy Area. The draft narrative written for this alternative is full of incorrect and misleading statements on the "benefits" to the resources which will occur if all livestock grazing is removed. The draft ignores the potential and probable adverse effects of the lack of livestock grazing on forage plants. Rangelands have evolved under, and are maintained by, the effects of grazing by animals, especially large herbivores. Livestock grazing is a legitimate grazing use on rangelands, and any management alternative which ignores this fact is not a feasible alternative.

31. Pg. 3 - 47

A. Bottom sentence, left column - Why do existing rangeland improvements have to be maintained at the existing level? Why not an improved level based on the needs of the resources?

32. Pg. 3 - 75

A. Right column, 2nd paragraph - The herder pattern system is not essentially the same as a season - long grazing system.

33. Pg. 3 - 76

A. Table 3 - 42 - The interpretation by BLM of the grazing systems proposed in this alternative is often incorrect. Many of the deferred systems shown in this table are actually deferred-rotation systems. Some allotments shown as season - long are not true season long systems, but are forms of deferment or seasonal grazing.

34. Pg. 3 - 82

A. Upper right column, 2nd paragraph - It is doubtful that "large" areas of bare ground would result from the construction of reservoirs and water troughs. Also, why can't we assume that these projects would be maintained so they wouldn't fill up with erosion deposits?

35. Pg. 3 - 86

A. Fourth paragraph, right column - Why would channel stability generally decrease due to increased livestock grazing intensity along streams, when livestock AUMs are not proposed to significantly increase in this alternative?

36. Pg. 3 - 92

A. Second paragraph under Vegetation types - Impacts will not "be basically the same for all vegetation types."

37. Pg. 3 - 98

A. Third paragraph, left column - It is doubtful that all of the types or all wildlife species will do the same thing on the Sandy area.

B. Fourth paragraph, left column - How can ample forage be available but class 1 qualifications still not be met?

38. Pg. 3 - 99

A. Under Wildlife, 1st paragraph - The statement that the impacts portray a worst case situation if all potential adverse conditions occur is hardly a realistic situation to analyze.

39. Pg. 3 - 109

A. Alternative 5 - This alternative is not an alternative action to the Proposed Action. It is the Proposed Action with additional intensive management suggested.

40. Pg. 3 - 133

A. Alternative 6 - This alternative is not an alternative to the Proposed Action. It is the Proposed Action with a more intensive system of livestock grazing suggested on 6 allotments, than Chapter 1 recommends.

B. Last sentence, 2nd paragraph under Alternative 6 - Deschampsia Caespitosa is a poor choice for a key species in these pastures.

41. Pg. 3 - 141

A. Table 3 - 93 - Change Title from Treatment B to Treatment E.

42. Pg. 3 - 146

A. Under Livestock Grazing, 1st sentence - Change "early - use" to "late - use" or reword the entire sentence so its meaning is clear.

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General Comments

1) Some of the maps have the color schemes mixed up with the legend. Check them all and change those that are wrong.

2) Make the map keys consistent for all maps in the RIS.

3) Make all map scales the same so boundaries, fences, projects, etc., can be compared between maps.

4) Expand the Appendix to include more examples of how data presented in RIS was obtained.

5) Provide a key which will show the person or persons responsible for each segment of the EIS. At the present time, no level of accountability for the statements made or data developed is apparent. The public has a right to know specifically who or where to go to, to get questions answered.

6) Rework Glossary of Terms. Some of the technical definitions are very shallow. An example: pg. G - 7, Percent composition is defined as "plant composition expressed as a percent." Percent of what? Dry weight, frequency, density, basal cover, canopy cover, etc.??

7) Personal Communication Section - It is rather hard to believe, or if true, then hard to understand, why no ranchers who graze their livestock on the Sandy are listed as having been personally contacted in the preperation of this draft EIS.

- -

Summary

These comments submitted here in no way reflect a complete evaluation of this EIS draft by the Old West Grazing EIS Monitoring Project. The public comment period of 52 days (including the one (1) week extension of time over the original 45 days allocated) is not an adequate time period to properly review a technical document of over 700 pages, taking almost three (3) years to produce by a BLM staff of 30 to 60 people, many working full time on it. The limited public review time prevented an evaluation which could include both positive and negative comments. The enclosed comments address only a small portion of the recognized deficiencies of this document. While this EIS draft as a whole can not be evaluated as "all bad", it is suggested that the BLM persons responsible for this EIS draft review and rewrite portions of the document in order to correct existing deficiencies. The Final Draft of the Sandy EIS must present, and environmentally analyze, the Proposed Action and Alternatives in a factual, (but qualitative when appropriate), objective manner.

COMMENTS OF DICK RANDALL, NORTH CENTRAL REPRESENTATIVE OF DEFENDERS OF WILDLIFE, ON THE SANDY GRAZING ENVIRONMENTAL STATEMENT, PREPARED BY U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT.

I feel it is appropriate that I write a rather lengthy commentary on this EIS for these reasons: I am intimately aquainted with the Sandy area - through my years with U.S. Fish and Wildlife Service as principal district field assistant for this area; through my profession as a wildlife photographer and journalist which requires a thorough knowledge of wildlife and it's habitat; as the author of numerous articles on the Red Desert, Big Sandy River, and wildlife in the EIS area; through my concern as a long-time Wyoming resident as to what is going on in my back yard; and especially as a representative of Defenders of Wildlife, a national conservation organization of approximately 40,000 members who are dedicated to the preservation of our wildlife heritage and the ecosystems upon which they depend.

There is a wealth of information to be found in this EIS. Supportive documentation made available at the Rock Springs, BLM office is at the very least, adequate; at the most, mind-boggling in it's mass and substance.

Since much of this data was gathered during a rather short time period it can only speak for the dedication and expertise of the EIS team.

I doubt that BLM's proposal and alternatives for management of the Sandy area will be acceptable to the public as a whole or to wildlife or livestock interests. But this disagreement should in no way reflect on the hard-won data to be found in this report. The EIS team is to be commended!

Defenders of Wildlife can not accept BLM's management proposal for the 2 million acres of public land encompassed in this EIS. Undoubtedly, the management proposal was formulated by people who interpret the words "multiple-use" to mean "many-livestock." Defenders of Wildlife is prepared to take whatever measures are required to defeat this "tunnel-vision" kind of thinking and to insure

that management of the Sandy area will consider public needs and desires, will provide priorities to protect and enhance wildlife habitat, and will assure that future generations of Americans can share in the wealth of wildlife and wide-open-spaces provided by these lands which we hold as community property.

Several United States Presidents, federal courts, and federal agencies, have defined the meaning of "multiple" in relation to public land use. Nowhere in these definitions has livestock grazing been named as primary beneficiary of the public lands, and yet, BLM's management proposal overwhelmingly favors priorities for livestock grazing, at the expense of other multiple uses.

Alternative number 2 should not have been included in this EIS since no one has proposed that all domestic livestock be removed from the Sandy area.

Whoever assembled the other 5 alternatives must have diligently searched for options that hardly anyone could agree with. Of course, if there were a hundred alternatives, there would still be disagreement.

I believe we can dispense with alternatives 1 through 4 without much discussion. Number 1 is obviously unacceptable to livestock interests who want to convert sheep use to cattle use. It is also unacceptable from our point of view since conversions have already been allowed and the increased cattle use is severely impacting riparian areas. Bone Draw is a good example of riparian destruction by cattle. Two days after turn-out (in May) cattle congregate on Bone Draw and remain there until September. Other wet-zones in the Sandy areas are receiving similar impacts.

Riparian and aquatic habitat on the lower Big Sandy have been cowed and sheeped almost out of existance. Cattle, both trespass and legal, can be found in this area throughout the year. The Thoman lambing operation which begins about the 1st of May, assures that any plant life missed by the cattle will be promptly gobbled up by the sheep. Then there is fall and spring sheep use as the herds move to and from the Rock Springs Lease.

In much of the Sandy area, livestock distribution by allotment is a fallacy. On paper, AUM allotments are unquestionably

an equable division of forage for both livestock and for wildlife. However, neither cows nor sheep can read maps, so they congregate on the wet-bottoms and riparian zones and they destroy vegetation that is critical to the survival of much of our wildlife. This destruction is increasing because of conversions to cattle use and because of the labor shortage for herded sheep operations.

The status quo, alternative number 1, is definately not acceptable.

Alternative 3, to "allow conversions without fences," has already proved to be unworkable. Cowboys needed to move congregations of cattle off the wet-bottoms are noted mostly by their absence. Trespass cattle from as far away as Jeffery City are showing up in the Sandy area. Cattlemen have demonstrated an inability or unwillingness to control their livestock on public land. To allow further conversions to cattle would only compound an already serious problem.

Alternative 4, designed by livestock operators, is simply a turn-em-loose and look for-em later, drift system. The allowable "10 to 15%" drift would make trespass laws next to impossible to enforce. It would allow 15% of the livestock (more if past history is any indicator) to overgraze forage that is vital to the survival of wintering herds of wildlife.

This alternative would impose severe management problems for BLM since sorting out trespass livestock from among 15% of the herds that legally could be anywhere on the allotments would be next to impossible.

Also, this alternative is not much different than season-long use. It would allow livestock to take off spring growth, come back in the fall and graze off any regrowth, and would not allow build-up of organic matter which is essential to the well being of any plant community.

On the surface, alternatives 5 and 6 appear to address the erosion and overgrazing problems, inherent to the Sandy area. On closer examination it becomes apparent that long-range objectives are geared toward producing more forage (grass) so that AUMs for livestock can be increased. In fact, BLM's managment proposal and all of the alternatives except number 2 (no-grazing) are aimed

toward increasing AUM allotments for livestock. Long-term management plans include vegetative manipulation designed to grow more grass for cows. This would be detrimental to many species of wildlife.

I believe we have a cart-before-the-horse situation. Cows and sheep are one of the multiple uses of public land. Wildlife is a national resource. To design a grazing program for livestock and then try to fit wildlife, wet-lands, riparian zones, into the nooks and crannies not occupied by cows and sheep constitutes a travesty. A management system that is responsible to the people who own these lands must first accomodate the resource (wildlife).

The EIS area is probably the largest single expanse of sagebrush, grassland steppes, in North America. It is a land of uninterrupted diversity, from salt-desert shrubs and grass, to aspen, juniper, and other conifers. This desert is an important wintering ground for a variety of raptors. Elk migrate across the EIS area from the Wind Rivers. And desert antelope thrive and move with the seasons, unrestricted by fencing. The proposed rest-rotation system coupled with vegetative changes would impact these resources.

The proposal states that perigrine falcon habitat would be improved. This is another fallacy. Riparian zones that provide habitat for waterfowl would be impacted. Fewer shrubs and less sagebrush means fewer sage sparrows and other small birds that provide part of the food source for the perigrine and for other raptors.

Rest-rotation as proposed by BLM has one main objective. More forage for livestock! Dr. Hormay has stated, "The amount of rest provided must be adequate to compensate for the intensity of use received to meet the objectives of all resource values."

Riparian areas, wet-bottoms, stream banks, require more rest than is provided in these management proposals. A study plot at Big Creek, Utah, required 5 years rest to achieve stream bank stabilization. After 20 years of protection, 14 miles reservoir is just beginning to stabilize. Before any kind of livestock rotation plan is initiated, impacted areas must be rested until desired revegetation and stream bank stabilization is achieved.

AUM carrying capacity used throughout this report is based on the 1964-65 survey and does not provide a factual base for livestock forage allocations and forage available for wildlife.

The 1964-65 survey appeared to be quite accurate, although emphisim was placed on cataloging forage for livestock, with aquatic and riparian studies relegated to the back burner. BLM has failed to up-date this survey and there are thousands of mythical AUMs floating around throughout this report that are no longer in existence.

Although LaBarge is not included in this EIS, surface disturbance in the LaBarge area is a case-in-point and is the only area I have membership. Based on rough calculations gained from ground observation and from USGS maps, between 19 and 30 square miles of vegetation has been destroyed by oil and gas drilling operations, production, and related pipelines and roads. As far as I can determine, these non-existent AUMs are still carried on BLM books as part of the available carrying capacity.

In the EIS area on the Little Colorado Desert, about 300 applications for oil and gas drilling permits are on file with BLM. Many permits have been grated and wells are being, or have been completed. Each of these operations, whether successful or dry-hole, will destroy some acres of desert vegetation.

Throughout the EIS area, since 1965, oil and gas operations, pipelines, roads, minerals exploration, and to a lesser extent, ORV use and increased recreation have destroyed or impacted thousands of acres of plant life. Carrying capacity, as determined in this EIS, makes no allowance for these forage losses.

Further, Wyoming and it's public lands are rich with mineral wealth. They have been described as "national sacrifice area" to provide energy for the rest of these United States. Right now, and tomorrow, national resource lands in Western Wyoming will suffer irreparable scars, inflicted by the extraction of minerals and related activities.

This is certainly not the time to look wildlife and livestock into a theoretical kind of management system that is unlikely to solve conflicts or provide solutions.

Cost/benefit equations for this management proposal portray one more taxpayer subsidy for a small, public land user group. Grazing fees collected from permitees will not even pay maintenance and operation costs for the rest-rotation system.

The initial outlay of taxpayer money needed to develop this system is estimated to be just under 3 million dollars. Probably the final cost will be much higher. Because of the small return from grazing fees the initial investment can never be amortized.

To calculate total cost of the proposed system we must place some kind of value, dollar or esthetic, on wildlife that will be impacted by fencing and by changes in the desert plant communities. These costs will probably total to much more than the price of the entire rotation system. Wyoming Game and Fish estimates the return to the State's economy from antelope alone in the EIS area to be about $300,000 per year. One bad winter with blizzards that drive antelope across the desert could spell disaster for many of the herds when they pile-up against some of the 500 miles of rest-rotation fencing.

So far, no one has been able to place a dollar value on aesthetics, which makes these values all the more precious. BLM's plan to increase livestock use in the Sandy area, complete with fenced cow pastures, will most certainly decrease aethetic values.

The proposed fence along the perimeter of the checkerboard is completely unacceptable. During a tough winter, survival of desert antelope, deer, and to some extent, free-roaming horses, depends on free access to the lower country on the checkerboard.

This fencing was requested by spokesmen for the Rock Springs Lease who wanted all horses removed from the checkerboard. However, since that time, spokesmen for the Lease have agreed to allow a small number of horses to remain on the Lease - providing BLM can keep the numbers down to a figure still to be agreed to. This compromise makes the checkerboard fence unnecessary

We believe that studies should be under-taken that would create blocks of private and public land on the checkerboard. Fencing by a cattle rancher in the Sands area has already excluded the public from part of the national resource land. Litigation over exclusion of the public from Elk Mountain checkerboard lands

is still going on. These lands are vital to the survival of many species of wildlife. Some kind of guarantee must be worked out that will assure continued use of these lands by wildlife.

The proposed rotation system requires that certain livestock be in a certain pasture during a specific time period. Because of energy development we are seeing a huge influx of people pour into this area, and we are cursed with more than our share of kooks and dingalings. Certainly, gates will be left opened that are supposed to be shut, and visa versa, which will create a problem almost impossible to police.

Obviously, some changes in grazing practices and rehabilitation of overused areas must be implemented. Our thoughts would be - do Slow! Do not jump into a system opposed by everyone who has testified and which has little chance of success. Study an area where rest-rotation is being used, such as the Burnt Fork.

No water development for livestock should be permitted on wildlife winter range. Water should be developed away from the winter range to help disperse livestock, to lessen impacts on riparian areas, and to achieve better utilization of available forage.

Herding for both cattle and sheep would be desirable. Coupled with strategic water development this kind of management would negate the construction of most fencing.

Critical riparian zones should be off-limits to livestock. Fencing would be necessary and desirable to protect these area. Fencing around reservoirs should be expanded to conform with BLM manual recommendations (7 times the water surface area should be fenced). This would provide for development of an aquatic and wetlands community instead of the fringe zones that would result from the small enclosures set forth in the proposal.

AUMs are alloted for wildlife but there is nothing in the plan to assure that winter-range forage will be available when needed.

I remember sitting through several meetings and providing comments when the Pilot Butte and Salt Wells MFPs were being formulated. Many of the wildlife proposals were adopted. Practically none of them have seen the light of day in the field.

Throughout this report, mostly under mitigating measuree, it is etated that we will study thie, monitor that, measure erosion, conduct maintenance inspections. Some of the same words can be found in the MFPs for Salt Wells and Pilot Butte. Perhaps the intentions were good, but the money never arrived and the projects never took plece.

We need more accountability from BLM. Where is the money coming from for all of the propoeed studies? The money is not included in the budget! And we are not fiddling with a few animals in a small corral. We are talking about the future of some of the greatest wildlife herds in our country. A variety and density of raptors that is second to none. And a chunk of public land thet is one of the last of the great, wide-open-speces. One or two feedlots in Colorado can produce more beef than the entire Sandy area - but feedlots can not turn out antelope, burrowing owls, golden eagles, or sagebrush elk. And the view from a fencepost in a feedlot is not nearly so pleasing es from a sage covered hill in the middle of the Red Desert.

We are dealing with public land that is a national treasure. We are simply not going to allow it to be chopped up into cow pastures.

Thanks much for the opportunity to comment on my favorite part of the country.

Dick Randell
North central field represtntative
Defenders of Wildlife
Box 507
Rock Springs, Wyo. 82901

Secretary Cecil Andrus
July 14, 1978
Page 2

the potential impacts and future resource values is extremely limited. It is difficult to differentiate between the use of actual field data and theoretical calculations.

It appears that the statement was prepared in a reverse manner. Instead of providing an objective analysis of the anticipated environmental impact resulting from the proposed action and alternatives, a theoretical intensive management grazing system was presented and a very subjective analysis of the alternatives and possible impacts was stated.

There are numerous inadequacies, inconsistencies and discrepancies throughout the statement. I will briefly discuss the relevant problems and provide reference to the appendices for more detailed responses.

Concerning the inadequacies of the statement, the NRDC suit required site-specific impact statements for some 212 grazing areas. The suit did not require a change in the management practices of each area. In supporting the intensive grazing management system as the proposed action, the statement inadequately describes the overall impacts of other possible alternatives. (Appendix I, p. 1-2). Other major inadequacies which deserve correction are as follows: estimates of stocking rates and carrying capacities (Appendix I, p. 1-2), vegetative and forage reproduction (Appendix I, p. 2), regional agricultural sales, income, earnings, and grazing values, (Appendix IV, p. 1-4), socio-economic analysis, (Appendix IV, p. 1-4), conditions and management, (appendix I, p. 3-4, appendix V, part I) the value of recreational uses (appendix IV, p. 4-5), water rights, evaporation quantities, water quality, Colorado compact, (Appendix VII, p. 1-7) and archeological, historical, trails, landmarks, visual impact, (Appendix VI, 1-3).

Specifically, the inconsistencies of the data use, methodologies, treatment of data results and conclusions, are very alarming. Considering the overwhelming amount of theoretical information and the important assumptions based on the compiled data, a consistent and accurate description of this information is of utmost importance. The following inconsistencies must be resolved and accurately reflected: vegetal production as related to precipitation, (Appendix I, p. 2), economic determinations as related to employment, livestock sales and receipts, and AUM values, (Appendix V, part I), recreational values as associated with public lands, (Appendix IV, part I-IV) (Appendix VI p. 3), management approaches for wildlife, (Appendix V, part I), and the analysis of water uses (Appendix VII, p. 1-7).

Significant variances or discrepancies within the

WYOMING
EXECUTIVE DEPARTMENT
CHEYENNE

ED HERSCHLER
GOVERNOR

July 14, 1978

Secretary Cecil Andrus
Department of the Interior
C Street, between 18th
and 19th Streets
Washington, D.C. 20240

Dear Mr. Secretary:

I have completed the review of the Sandy Grazing Draft Environmental Statement as required by the National Environmental Policy Act, the Office of Management and Budget Circular A-95 (revised) and the Wyoming State Review Procedures. My review and the reviews made by interested state, local and public entities have raised several very critical questions concerning: the complicated and confusing manner in which the statement was written; the methodology and analysis of technical data; the failure to reflect local input; the lack of justification for the continual support within the statement of the "proposed action"; and the lack of support for the "proposed alternatives". Most of the livestock industry in Wyoming is very dependent on continued access to and effective management of federal grazing lands and will be directly affected by the outcome of the site-specific grazing statements. Due to the importance of this issue, not only to the livestock industry but to other interests such as rural communities, wildlife enthusiasts, recreationists, etc., it is very disturbing to me that the Sandy Grazing Impact Statement may set the precedent for other forthcoming site-specific grazing environmental statements.

With regard to the complicated and confusing manner in which the statement is written, I am alarmed by the volume of information based on theoretical assumptions and presented in formulas and intricate computer terminology. The data base and multiple resource information used in many parts of the statement are technically inadequate to support the degree of definitive narrative statements, graphs, charts and maps. It is perplexing to interpret many of the illustrations and narrative statements due to the inconsistent scales, incorrect keys and improper footnotes. The technical literature to quantitatively support

Secretary Cecil Andrus
July 14, 1978
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narrative, general assumptions, graphs, maps, charts, and illustrations destroy the statement's credibility as a basis for effective grazing management. It is impossible to identify how much of the information is "fact" and how much is simply "assumption". Discrepancies have been identified within the following areas: soil compaction resulting from numerous uses, (Appendix I, p. 2, Appendix V, part I and III), stream channel stability and stream deterioration, (Appendix I, p. 2, Appendix V, part II, Appendix VII, p. 1-7), aquatic resources and management, (Appendix I, p. 2-3, Appendix V, part IV), recreation activities, (Appendix I, p. 2, Appendix II, p. 1, Appendix IV, p. 3-5), multiplier effect of new money, (Appendix IV, p. 3), wildlife resources, management, and possible impacts, (Appendix V, part I -V, Appendix VII, p. 1-7). The Wyoming Game and Fish Department, Wyoming State Engineers Office, and Wyoming Department of Agriculture have prepared extensive reviews of the Sandy Grazing Statement and have offered pertinent comments relevant to many aspects of the proposed action and alternatives. These deserve a detailed analysis and full consideration.

Another major problem relevant to the content of the statement is the failure to reflect local input and to consider local expertise. An extensive effort was made by local interests in reviewing the preliminary draft and providing substantive comments regarding the recommended action. It is not evident within the statement that local effort was utilized or even considered. There is no indication that the local interests were asked what would be best for the communities, what would be best for the ranchers, what are the wildlife needs, what are the recreation needs, or what trends (climate, soils, water, vegetation) have occurred. I am very skeptical of studies that are based solely on the theoretical assumptions, utilize only formulas to estimate soil erosion, grazing intensity, forage production, etc., and totally overlook the knowledge and experience of the local interests.

The proposed action is persistently favored throughout the statement. However, there is no clear justification for why this particular action was chosen. Pursuant to the National Environmental Policy Act, federal regulations require agencies to ". . . review their actions in a manner calculated to encourage productive and enjoyable harmony between man and his environment, to promote efforts preventing or eliminating damage to the environment and biosphere and stimulating the health and welfare of man and to enrich the understanding of the ecological systems and natural resources improtant to the Nation". The Sandy grazing statement fails to provide sufficient rationale to prove that the intensive management of approximately 98 percent of the Sandy area would meet the above mentioned requirements.

Secretary Cecil Andrua
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Throughout the statement the propoaed alternatives are expressed in a very negative manner. Section 102 (2) (D) of NEPA requires agencies to ". . . study, develop and describe appropriate alternativos to recommended courses of action in any proposal which involves unresolved conflicts concerning altenative uses of available resources". Federal regulationa stipulate ". . . a rigoroua exploration and objective evaluation of the environmental impacta of all reasonable alternative actions, particularly thoae which might enhance environmental quality or avoid some or all of the adverae environmental effects, is essential". There is no evidence that the statement objectively presents each alternative or adoquately addresaes the environmental impacts of the proposed alternatives.

In conclusion, I have found the Sandy Grazing Statement remiss in fulfilling the mandate of the National Environmental Policy Act, 1969, and in meeting the requirements set forth by the court. Also, I view the proposed action and the six alternatives, if implemented, as being a detriment to the resources and the local economy of the Sandy area. I recommend that the above mentioned inadequacies, inconsistencies, discrepancies and problems be considered and resolved prior to the preparation of the final environmental impact statement.

Thank you for the opportunity to review the draft atatement. Please keep me informed of any further developments on the Sandy Grazing Statement.

Yours sincerely,

EH/trl

cc: Mr. Dan Baker,
State Director, BLM
Mr. Dean Forsgren,
Rock Springs BLM
Mr. Calvin Ragsdale,
Attorney at Law, Green River

Enclosures

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Appendix I

THE STATE OF WYOMING

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Wyoming Department of Agriculture

TELEPHONE (307) 777-7321 CHEYENNE, WYOMING 82002

LARRY J. BOURRET COMMISSIONER

BOARD MEMBERS
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ED HERSCHLER, GOVERNOR
DR. HAROLD TUMA, DEAN
COLLEGE OF AGRICULTURE
UNIVERSITY OF WYOMING, LARAMIE

DATE: July 12, 1978

TO: Steve Freudenthal
State Planning Coordinator

FROM: Larry J. Bourret, Commissioner
Department of Agriculture

SUBJECT: Sandy Environmental Impact Statement

These are our comments relative to the Sandy Environmental Impact Statement.

I believe that a brief review of the Sandy EIS will cause one to wonder if the Bureau of Land Management has not used the Natural Resources Defense Council lawsuit to bring about major changes in livestock grazing whereas the lawsuit merely required an environmental impact statement to be written on livestock grazing.

As support for that statement, I would refer to the hearing transcript from the Wednesday, July 28, 1978 hearing at Rock Springs, Wyoming in the matter of public hearing on Draft Environmental Impact Statement Sandy Grazing before the Bureau of Land Management. One has to read but to the bottom of the second page where one finds a statement by Mr. Dean Forsgren who was the BLM team leader for the Sandy Environmental Impact Statement. Mr. Forsgren makes this comment; "The statement is being prepared as the result of environmental statement agreements worked out through the Natural Resources Defense Council lawsuit, which was brought against the bureau in 1973, claiming that the bureau's programmatic environmental statement, which is a bureau-wide statement covering all the lands in the west, was inadequate to meet the National Environmental Policy Act. As the result of that meeting, court agreement was reached between the NRDC and the bureau, that the bureau will prepare some sites specific ES. The Sandy Environmental Statement is the first to be prepared in Wyoming. The statement is designed to provide management with an analysis of what would occur if the proposed action were implemented. I would like to stress, this statement is not a decision-making document, but will be used along with other data to determine the course of action that will be adopted for the Sandy area."

Mr. Forsgren on page 6 goes on to say, "Thirty days after the final statement is filed, the district manager can implement the proposed action or any one of the alternatives and any combination of proposed action of (sis) alternatives. Whatever is adopted, will be adopted through the regular bureau procedures,..." It is evident that the BLM has used the NRDC suit to attempt to impose a management system on the Sandy that may not be successful. The NRDC suit did not require change in management but required impact statements on livestock grazing.

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Mr. Steve Freudenthal
July 12, 1978
Page 2

If the BLM District Manager can implement actions why was this EIS written in such a manner as to attempt to propose major livestock grazing changes when the EIS could have merely covered the present system. Thereafter proposals could have been submitted on changes in the system.

Many years need to be spent in an area such as the Sandy Grazing Area to become familiar with the many different climatic conditions, wildlife habitats and forage conditions. To do a study and write a plan in three years does not seem feasible.

Page 2-12 Soil Compaction: Livestock grazing is blamed for soil compaction, wildlife, hunting vehicles, and recreation vehicles can cause soil compaction and destroy surface structure.

In the written context of chapter two under the Aquatic Wildlife section, livestock are blamed for streambank erosion, sloughing and general deterioration of the various streams within the study area. The following pages in the Environmental Statement blame livestock grazing for stream bank deterioration; pages 2-98, 2-104, 2-106 and 2-110.

When we refer to Appendix 38-Methods used in Channel Stability Analysis, we find that this appendix refers to three factors effecting stream channel stability; grazing intensity, length of rest, and improved potential. The devised formulas are not referenced and the constant numbers involved are not explained as to how they fit into the formula or where these numbers were derived from. As used in the proposed action page 3-16 appendix 38 is not explained. Explanation is not given why other factors are not considered in the formula. Some other factors to consider might be climatic conditions, amount of rainfall, amount of instream water flow, intensity of wildlife grazing in the specific area, and recreational use. All factors should be considered when dealing with channel stability. We are concerned that many comments in the draft point out that livestock damage stream channel stability and that appendix 38 indicates that one portion of the formula is "I--Grazing intensity" but nowhere in the EIS is there data to show what impact all ungulates contribute to this situation. Nor does the EIS indicate what the impacts will be from proposed actions. What about wild horse impact? We cannot find any analysis of natural stream channel instability and we believe it is a fact that such does occur.

Additionally, we find that the proposed action will not move any allotment from a "fair" rating to a "good" rating (see page 2-36). Were all ungulates and wild horses included in this analysis. Page A-61 indicates that ungulates are present and should be considered in stream evaluation--but were all ungulates considered?

Page 2-125 fourth paragraph conflicts between recreation activities and existing non-recreation activities. Recreationists need to realize the hotdog and hamburger they may be eating on their next outing could very well be grazing in front of them.

The benefit of livestock grazing to camp sites need to be recognized, livestock keep the grass from growing high and keep the weeds down. Without livestock grazing, recreationists would not have the many convenience foods for their outings.

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Page 3

Page 2-135--next to last paragraph under Wilderness Resource. The sentence (The Red Desert...of environmental concern). Why is this area of such an environmental concern?

Page 2-150--Water use, How can the statement be made saying water quality will decrease under the present conditions because of livestock usage, there is no data to support this statement.

Page 2-150 Vegetation--This section implies under the present situation vegetation and forage will decrease. There is not stated reference to show this situation will happen.

Page 2-150--Aquatic, this section implies streams will become little more than water canals, can this be so, there is no reference document to support this idea.

Page 3-84 and 3-85--Pictures--these pcitures are not true comparisons, Figure 3-3 and 3-4 are apparently taken after a heavy snow fall which could cause the willows to be packed down and even broken up. Figures 3-5 and 3-6 could have been taken after a very light snow fall to give the snow effect in the photos. After a normal wet year around normal grazing the willows could have this amount of growth. This is a very poor comparison and cannot be blamed on livestock grazing. Wildlife can and could have caused the same effect on willow growth. Mention should be made in the descriptive paragraph to the effect wildlife and wild horse herds can have on stream banks. Blame should not be attributed to livestock grazing only.

Page 3-88, Figure 3-8--the explanation of these figures should point out even under ideal conditions many stream banks could not even become the desired condition BLM would like to have due to the erosion characteristic of the stream itself.

Page 3-94--Wild Horses - The impacts wild horses have on the environment should be stated in the environmental statement. Wild horse herds will do as much damage to watering places, streams, and forage if not more than livestock grazing does. Wild horses do not benefit the environment. Wild horses are not a native to the area. If left to fend for themselves, cattle and sheep could become as the wild horse, only wild cows and wild sheep.

Page 3-111 - Recreation Resources - Assumptions first paragraph under factors, wildlife should be included in number one. Wildlife and wild horses can trample and leave an accumulation of feces in recreation sites as well as livestock.

Page 3-119-- Attitudes and Expectations Number 3 - The livestock grazers do not believe the proposed action will give them more flexibility, but just the opposite. The livestock grazers feel the proposed action will cause them considerable hardship in management of their operations.

Are we to assume that the Figure 3D-3 will apply only to livestock or will all ungulate and wild horse grazing be subjected to this apparently complex analysis?

We object to the BLM proposing a system which dictates management of 87,185 acres of State of Wyoming property. We also object to the BLM proposing a system which dictates management of 48,400 acres of private lands.

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Mr. Steve Freudenthal
July 12, 1978
Page 4

On page 2-62 we find that wildlife and wild horse already have more forage available than do livestock. Why then do we assume that the livestock should be reduced? Whom determined the "desired" numbers on page 2-79? What forage would be available under each alternative to each type of animal?

We are very concerned about the socio-economic analysis and would subscribe to those raised by Mr. Willis Gordon Kearl (see attached) and we wish to make his comments a part of our comments, his concerns a part of our concerns, and his questions a part of our questions.

Also see attached comments by Dan Hartley and Dwight Kimsey that I endorse and wish to have made a part of these the Wyoming Department of Agriculture comments.

We certainly needed more time for analysis of the EIS and for preparing comments and we feel that congress did not intend that an EIS be three years in preparation and 45 days in comment when they enacted NEPA. Apparently something has gone wrong since 1969.

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Appendix II

THE STATE OF WYOMING

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Wyoming Department of Agriculture

TELEPHONE (307) 777-7321 CHEYENNE, WYOMING 82002

M E M O R A N D U M

DATE: July 12, 1978

TO: Larry J. Bourret, Commissioner of Agriculture

FROM: Daniel Hartley *Daniel K. Hartley*

SUBJECT: Sandy EIS - Comments

Page A-63. We find that Stevens (1975) is supposedly used as the basis for economic determinations; and in fact a quote is alleged to have been lifted from Stevens (1975) but we have reviewed said reference and cannot find said quote.

Page A-63. Income from recreation is listed and we feel we are led to believe that the agency obtained that data from "A Strategic Plan for The Comprehensive Management of Wildlife in Wyoming, 1975-1980," but that reference does not contain any economic data such as found on page A-63.

DRH/rw/jb

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APPENDIX III

THE STATE OF WYOMING

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GOVERNOR

State Conservation Commission

2219 CAREY AVENUE PHONE (307) 777-7321 CHEYENNE, WYOMING 82002

COMMISSION MEMBERS
LARRY BOURRET, CHAIRMAN (STATE AG. DEPT.)
CHARLES JAMESON, VICE CHAIRMAN (AREA V DIRECTOR)
JAMES R.L. MAY (AREA II DIRECTOR)
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GEORGE CHRISTOPULOS (STATE ENGINEER'S OFFICE)
EUGENE HARDY (LIVESTOCK BOARD)
JOHN NILAND (D.E.P.A.D.)

July 12, 1978

M E M O R A N D U M

TO: Larry J. Bourret, Commissioner of Agriculture

FROM: Dwight Kimsey, Conservation Commission

SUBJECT: COMMENTS ON GRAZING CAPACITY ANALYSIS-SANDY ENVIRONMENTAL IMPACT STATEMENT

Basic to the establishment of "improved management systems" is a realistic estimate of stocking rates and carrying capacity in the past, present and future time frames.

Past - Historic sites, resources and trails are discussed, but none of the known journals and diaries of early travelers is mentioned. In order to establish vegetal trend, something needs to be known of the climax ecological condition. The myriad of vegetal descriptions given by early travelers such as Townsend show the vegetal trend is definitely improving. Impartial study of these historical documents should be required.

Present - Appendix 2I, page A-30, states that Table 2I-1 was used to establish range site production for the range sites used in each soil mapping unit.

According to the National Range Handbook, USDA-SCS. Section 700, the Production Record (PR) segment of the Range Data System (RDS) requires range conservationists to collect production data on form SCS-RANGE-417 over a period of several years. This basic production record is then filed on a computer and used for the development of Range Site Descriptions.

In the "Sandy Area" the Soil Conservation Service has filed no (not even one) form SCS-RANGE-417 production record. Further Table 2I-1 as shown contains no production records, which are found in the SCS, Technical Guide, Section II E under "Range Site Description" and not as referenced.

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According to the SCS National Range Handbook, Section 308, initial stocking rate guides (which are not the same as grazing capacity estimates), are developed from actual use records. These actual use records are the result of rancher experience over a span of several years and are not related to vegetal production. The assembly of actual grazing records from which initial stocking rates can be developed is part of the SCS's basic resource inventory. No such records have been assembled by SCS in the "Sandy Area."

Future - Appendix 2I, page A-36, references the Range Technician Handbook by the Soil Conservation Service which local SCS agents feel does not exist. The National Range Handbook and the Technical Guide, Section II E, appear to be the correct references. Nowhere in the SCS process for developing production records does the term forage production appear. SCS uses an ecological condition class system which measures total vegetal production without reference to forage. Section 603 of the National Range Handbook discusses production.

Again, Section 308 of the National Range Handbook explains the SCS method of arriving at initial stocking rates. No such data exists for the "Sandy Area."

If the data base for past present and future estimates of carrying capacity are not accurate, then the "improved management systems" are not based on factual information.

Vegetal Production Related to Precipitation

Figure 2-9 on page 2-23 shows wide variation in rainfall and only few years with over 10 to 11 inches of precipitation. Yet, the grazing treatments on page 3-114 do not take variations in climate into account. Regressions relating productivity to rainfall exist, but are ignored in preference for a simplified grazing system which allows easier control of livestock.

Gus Hormay firmly believes that grazing systems should be based on plant physiology and that the objectives of the system should be to provide reproduction of desirable plant species. Treatments B, C and D are climate-dependent in this region. Little response is possible when rainfall is less than ten inches with these treatments. The grazing systems should allow full use during years of low rainfall, like Gus Hormay did at the Susanville trials.

Production is not an average, instead it varies with precipitation. Clipping studies would reveal a suitable regression to allow adjustment of the grazing systems. If the Bureau of Land Management insists upon using "average production" then the standard deviation and coefficient of variation should be part of the analysis. In very real terms, I doubt if forage production can be predicted within plus or minus 60% in this area unless current precipitation is used to adjust the estimate.

Grazing systems which ignore yearly variations in precipitation are not designing with nature.

DWK/mn

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Game and Fish Department

CHEYENNE, WYOMING 82002

EARL M. THOMAS
DIRECTOR

July 13, 1978

Mr. Dan Baker
State Director
Wyoming State Office
Department of Interior
Bureau of Land Management
Cheyenne, Wyoming 82001

Dear Mr. Baker:

Our review comments on the Sandy Grazing D.E.S. are attached. They consist of five parts, a summary and appended material.

There are aspects which are desirable in the Proposed Action and in each of the six alternatives, but they are invariably in conjunction with less desirable or undesirable aspects. In view of this, we have included in Part V of our comments a list of elements to comprise an alternative No. 7. This alternative is based on the habitat requirements of game and non-game wildlife species inhabiting the Sandy area and is consistent with the multiple-use concept.

Please contact us if additional wildlife information is needed during preparation of the final draft.

Sincerely,

W. Donald Dexter

W. DONALD DEXTER, ASSISTANT DIRECTOR
WYOMING GAME AND FISH DEPARTMENT

ATTACHMENT

WDD:BEM:ag

31d

July 7, 1978

WYOMING GAME AND FISH DEPARTMENT

COMMENTS AND REVIEW

OF THE DRAFT

SANDY GRAZING ENVIRONMENTAL STATEMENT

The following comments regarding the Sandy Grazing DES consist of five parts as follows:

Part I – Existing Situation (status and habitat requirements and management for the maintenance of: Pronghorn Antelope, Elk, Sage Grouse, Mule Deer, Moose, and other indicator species in the Sandy Area).

Part II – Evaluation of the proposed action and the alternatives.

Part III – Recommendations and comments on designs and procedures for important elemental considerations.

Part IV – Specific comments on the DES concerning aquatic resources.

Part V – Alternative No. 7 - Wyoming Game and Fish Department Alternative.

Summary

PART I - EXISTING SITUATION

PRONGHORN ANTELOPE

Range

Antelope occupy all of the Sandy Area yearlong. Three major antelope herd units occupy portions of the Sandy Area seasonally. The Sublette antelope herd occupies the northern portion of the Sandy, and hunt areas 86, 85, 90, 91 and 96 occupy all or a portion of the Sandy. The Dry Lake herd (hunt area 92) occupies the southernmost portion of the Sandy. The Red Desert herd's hunt area 60 occupies the eastern-most or Divide Basin portion of the Sandy ES Area. Hunt areas 91 and 96 of the Sublette Herd Unit are entirely contained within the Sandy Area.

Since the writing of the draft ES, more definitive long-term data has been collected on seasonal antelope distribution in the Sandy Area. An updated discussion map for antelope in the Sublette and Dry Lake antelope herd units is presented in Map 1. These data were compiled from past distribution maps, winter range distribution surveys conducted from 1973 through 1978, and yearlong antelope observations (Lockman, 1977; Lockman 1978).

Population objectives (desired population levels) for antelope in the Sandy Area are based on herd units. Table I illustrates the existing population estimates and population objectives for antelope herd units which occupy portions of the Sandy Area (Lockman, 1978; Hiatt, 1978; Herd Unit Status Report, 1978).

Table I. Existing Pronghorn Population Levels and Population Objectives for those Herd Units Occupying Portions of the Sandy ES Area.

Herd Unit	Hunt Areas Comprising the Herd Unit	Existing Population Estimate (post-hunt, 1977)	Objective (post-hunt)	Management Strategy
Sublette	64W, 65W, 85-90, 91, 96	19,000	18,400	decrease and stabilize
Dry Lake	92	1,000	2,500	increase and stabilize
Red Desert	60, 61, 64S	Estimate pending further analysis	10,000	increase and stabilize

The period of occupancy of seasonal antelope ranges has varied over the last eight year period. In winter, forage availability relative to snow depth and weather conditions triggers movement toward a critical winter range. The duration and intensity of the winter dictates the length of time pronghorns spend on the winter/ yearlong and critical winter range.

Past records and more recent population investigations indicate that once every 20-25 years this area experiences a very harsh winter such as that experienced in 1971-72. In such years antelope mortality is anticipated to be significantly greater than "normal". Once every 5-10 years the area experiences a winter of such duration and severity that mortality may exceed what is considered to be "normal". The periodicity of a severe winter/yearlong drought is unknown; however, a drought similar to that observed in 1976-77 has not occurred since 1934-35. Distribution data presented on Map 1 account for the effects of the harsh winter of 1971-72 and the mild winter and dry summer of 1976-77 on antelope herd movements and distribution. The map also shows herd distribution in winters preceding the winter of 1971-72 and the winter of 1977-78. The winter of 1977-78 and the winters between 1972 and 1976 were considered relatively mild and more typical of local weather conditions.

Table II shows average dates of pronghorn seasonal range occupancy for herd units within the Sandy Area.

Table II. Pronghorn Antelope Seasonal Use in the Sandy ES Area (Approximate dates based on data collected in 1971-77, 1975-78).

Seasonal Range	Seasonal Range Designation	Period of Use
Summer	Summer (S), Winter/Yearlong (W/Y)	April 15 - October 20
Intermediate Winter	Winter/Yearlong (W/Y), Critical Winter and Critical Winter/ Yearlong (W/Y)	October 20 - January 15
Critical Winter	Critical Winter and Critical Winter/ Yearlong (W/Y)	January 15 - April 15

Even in "normal" winters, as observed in 1975-76 and 1977-78, crusted and drifted snow conditions to 18 inches in depth precluded the use of intermediate winter range and forced movements to critical winter ranges.

In a harsh winter such as that of 71-72, there will be movement of much of that portion of the Sublette Herd that normally winters north of the Sandy Area onto winter range on the south of the Sandy Area. Observations and photographic indicate that basin big sagebrush is a very important forage and cover species for antelope in an extremely harsh winter (Julian, 1973; Personal communications with Max Lora, 1976). Continuity of expanses of native, sagebrush-grassland vegetation allowed migratory antelope in this area the flexibility through movement to alter their seasonal distribution in harsh winter. Distributions delineated on Map 1 depict seasonal ranges of this herd over the last ten year period, but may not reflect the distribution of wintering antelope numbers in a subsequent harsh winter (Fig. I and II).

Numbers of antelope occupying Sandy winter ranges vary with the population size of the Sublette herd and the severity and duration of the winter. In mild winters there is relatively little movement of antelope from the north. In more "normal" winters there is a movement of antelope from hunt areas 87 and 90. In all winters from 1973 through 1978, including the mild winter of 1976-77, there was a movement of antelope from hunt areas 64W and 65W onto winter ranges in the Sandy. Consequently, relative densities of pronghorns on antelope Sandy winter ranges vary over time (Lockman, 1976, 1977, 1978). Assuming a population equal to the population objective for the Sublette herd, the estimated wintering herd size in the Sandy Area will range from 18,400 (in an extremely harsh winter), to 6,000 (in a mild winter)*, with an estimated 10,000 occupying the Sandy ES Area (in a more normal winter)**.

*6,000-This figure is based on the estimated wintering herd size in hunt areas 91 & 96 of the Sublette herd unit (Interview (Lockman, 1978).

**10,000-This figure is based on an estimated increase of 2,000 antelope from hunt areas 64W and 65W, and 2,000 antelope from the southern portion of area 87 and most of area 90 in the winter 1977-78 (Lockman, 1978).

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Numbers of antelope occupying Sandy winter ranges vary with the population size of the Sublette herd and the severity and duration of the winter. In mild winters there is relatively little movement of antelope from the north. In more "normal" winters there is a movement of antelope from hunt areas 87 and 90. In all winters from 1973 through 1978, including the mild winter of 1976-77, there was a movement of antelope from hunt areas 64W and 65W onto winter range in the Sandy. Consequently, relative densities of pronghorns occupying Sandy winter ranges vary over time, (Lockman, 1976, 1977, 1978). Assuming a population equal to the population objective for the Sublette herd, the estimated wintering herd size in the Sandy Area will range from 18,600 (in an extremely harsh winter), to 6,000 (in a mild winter)*, with an estimated 10,000 occupying the Sandy ES Area (in a more normal winter)**.

*6,000-This figure is based on the estimated wintering herd size in hunt areas 91 & 96 if the herd was at the level of the population objective (Lockman, 1978).

**10,000-This figure is based on an estimated ingress of 2,000 antelope from hunt areas 64W and 65W, and 2,000 antelope from the southern portion of area 87 and most of area 90 in the winter 1977-78 (Lockman, 1978).

WYOMING GAME AND FISH DEPARTMENT

COMMENTS AND REVIEW

OF THE DRAFT

SANDY GRAZING ENVIRONMENTAL STATEMENT

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Part II - Evaluation of the proposed action and the alternatives.

Part III - Recommendations and comments on designs and procedures for important elemental considerations.

Part IV - Specific comments on the DES concerning aquatic resources.

Part V - Alternative No. 7 - Wyoming Game and Fish Department Alternative.

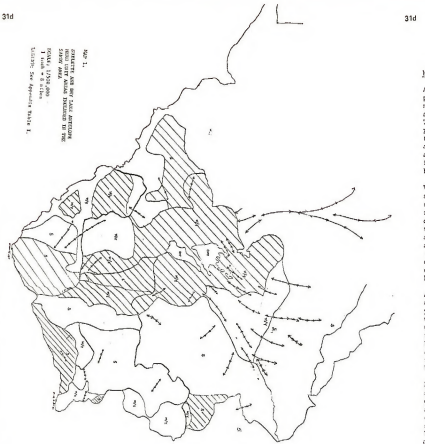
Summary

PART I - EXISTING SITUATION

PRONGHORN ANTELOPE

Status

Antelope occupy all of the Sandy Area yearlong. Three major antelope herd units occupy portions of the Sandy Area seasonally. The Sublette antelope herd occupies the northern portion of the Sandy, and hunt areas 64, 65, 90, 91 and 96 occupy all or a portion of the Sandy. The Dry Lake herd (hunt area 92) occupies the southwest portion of the Sandy. The Red Desert herd's hunt area 60 occupies the eastern most or Divide Basin portion of the Sandy ES Area. Hunt areas 91 and 96 of the Sublette Herd Unit are entirely contained within the Sandy Area.



Habitat Requirements and Management for the Maintenance of Pronghorn Herds

According to Sundstrom (1973), "optimum antelope habitat is characterized by the presence of Wyoming big sagebrush". Autlan (1973) and Long (1976, personal communication) emphasized the importance of basin big sagebrush, a taller subspecies, as forage and cover for antelope in harsh winters. Bayless (1968) in Montana and Taylor (1972) in the Red Desert of Wyoming found that sagebrush was selected by pronghorns. Both investigators found that sagebrush consumption was greatest in the winter, with substantial though lesser amounts eaten in other seasons. On antelope winter ranges in the Sandy Area, denser patchings of Wyoming big sagebrush and other shrub species should be maintained at or near existing levels. To provide forage and cover for antelope in extremely harsh winters, basin big sagebrush should be maintained where it now occurs.

Vegetation composition on antelope summer and non-critical winter/yearlong ranges should be maintained at 10-20 percent Artemisia spp., 5-15 percent other browse species, and 25-35 percent forbs (Sundstrom, 1973). In the Sandy Area it is recommended that a shrub composition of at least 30 percent and forb composition of at least 30 percent be maintained on antelope spring-summer-fall ranges. Methods to minimize deterioration of some riparian sites and moist meadow sites by livestock and feral horses would increase the availability of forbs and succulent grasses in antelope in spring and summer. Lockner (1970), Yolander et. al. (1961), Klebenow (1970), Mallmo et. al. (1977) and Thorne et. al. (1976) have documented the importance of succulent forbs and grasses in spring and summer to female antelope, deer, and elk that are giving birth and lactating. Proper feed at that time helps maintain herd vigor and productivity.

Antelope population objectives should be altered only after use of big sagebrush and other important winter range shrubs has exceeded 30 percent in three consecutive years. Taylor (1975) suggests that annual use of big sagebrush over 30 percent will lower the health and vigor of a stand. BLM should measure utilization annually using an adequate sample size and distribution of production-utilization and vegetation composition transects on antelope winter ranges. This criterion should only be used after measures have been taken to minimize livestock use of shrubs important as winter range for antelope. Seasonal livestock use of shrubs on antelope winter range exceeding 5 percent in the spring-summer-fall period is excessive and should be curtailed.

Permanent water sources on arid, water-deficient summer ranges would spread out summer antelope distribution. Livestock or wildlife water should not be developed on critical antelope winter ranges. Such water sources allow spring-summer-fall antelope use of shrubs important in the winter. Taylor (1975) emphasized that competitive livestock use of critical winter range should be discouraged. Winter sheep use of antelope winter range is not desirable, however, moderate summer use by cattle does not lower the carrying capacity of antelope winter range. To accommodate antelope, permanent water sources should be spaced not more than 3-5 miles apart, and should be available to antelope in summer and fall when livestock are not utilizing the range or water source.

Fichter (1974) and Autenrieth and Fichter (1975) in Idaho, Pyrah (1974) in Montana and Ingold (1968) in Wyoming have documented the importance of big sagebrush on

FIGURE I. Movements and approximate numbers of antelope in the Sublette Antelope Area in October-December, 1971 (Sullivan,1973)

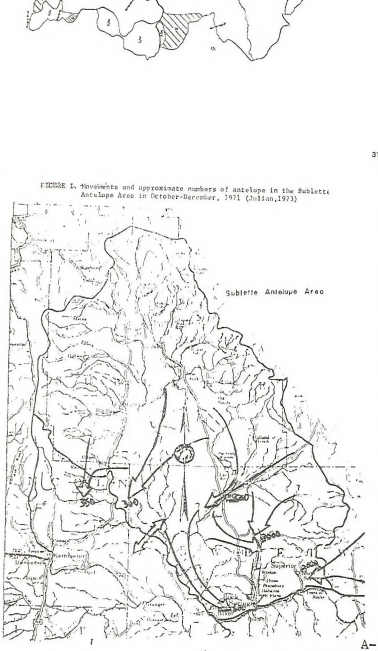
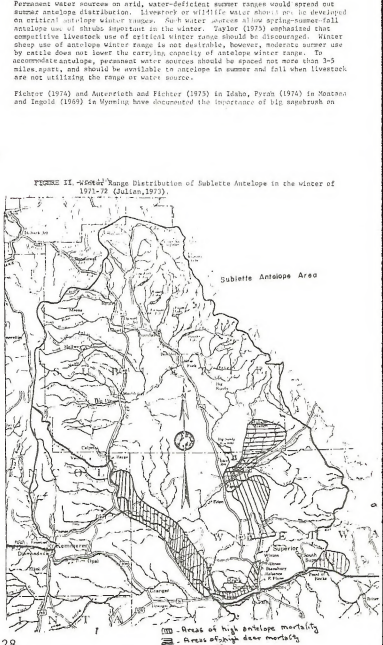


FIGURE II. Winter Range Distribution of Sublette Antelope in the winter of 1971-72 (Julian,1973).



- Areas of high antelope mortality
- Areas of high deer mortality

fawning sites used by female antelope. The above investigators disagree about selection of traditional fawning areas by females. Although data on doe antelope distributions immediately prior to parturition in the Sandy Area are not conclusive, specific fawning areas are not discernible. Spring habitat conditions which govern the movements and distribution of females determine the location of fawning. Antelope fawning activities in the Sandy Area occur throughout winter/yearlong and summer range and may be governed to a large degree by occurrence of succulent spring forage close to dense sagebrush cover. Studies to date have not provided any quantitative vegetational parameters for fawning sites which would be useful in the development of antelope habitat management objectives. Autenrieth (1976) found that fawns selected greater than average brush canopy coverage, total coverage and brush height. In the Sandy Area existing shrub composition of the summer range should be maintained until more definitive data on antelope fawning habitat are obtained.

Fencing has long been a problem associated with the management of antelope and antelope habitat. The development of guidelines for fencing on pronghorn ranges has repeatedly demonstrated that there are no universal guidelines which can be applied in every situation. In many areas of eastern Wyoming, pronghorns do not move extensively in response to winter weather in most years. Consequently, fencing which will accommodate spring-summer-fall antelope movements may be tolerable. However, in southern and southwestern Wyoming, antelope migrate between summer and winter ranges in most years. In the Red Desert, Taylor (1975), stressed the importance of fencing considerations in the development of livestock grazing systems. Oakley and Riddle (1972) and Oakley (1973) documented direct mortalities associated with grazing system fences during a harsh winter in the Red Desert. These investigators also discussed the alteration of movements and winter antelope distribution due to fences. The Sandy Area to date is relatively unfenced, but there has been an increase in highway right-of-way fences in recent years. Bureau of Reclamation lands and private lands within the Eden-Farson Irrigation Project are fenced with sheep-tight barbed-wire and net wire fences. Some private lands along the Sweetwater River east of Highway 28 are fenced. The White Acorn Allotment along the Sweetwater River is fenced with 3-strand barbed-wire designed to better accommodate antelope movements. Net wire and four- to five-strand barbed-wire fencing is used on private lands and around an individual use pasture in the Prospect-Lander Creek, Arranbelle and Spicer Ranch areas on antelope summer range. The following is a summary of the fence problems which have been observed in the Sandy Area in the last three years:

1. Eden-Farson Irrigation Project-five-strand barbed-wire fence with bottom wire 2 to 4 inches above ground level on Bureau of Reclamation lands bordering the Irrigation Project.

Antelope have become trapped in various areas within the project. These animals feed yearlong in overgrazed sagebrush-grassland and salt desert shrub habitat types and do not have access to forbs or irrigated croplands. The debilitating effects of pronghorn residing yearlong on these overused sagebrush-grassland ranges were documented by Lockman (1977). During the last two springs we have dropped sections of fence and opened gates in some of these areas to induce movements out of the project. In the dry spring of 1977, efforts to move antelope out of some portions of the project were unsuccessful. However, in the wet spring of 1978, when succulent forbs were available outside the fence, we met with some success. In one case antelope moving from winter to summer range got through a

section of brokendown project boundary fence and drifted into a five-strand fence corner at the opposite end of the sage-grass pasture. They remained in a corner until the fence was dropped, then most of the antelope moved onto open range. Attempts at driving this group of antelope through the let-down fence failed, but they found the hole and escaped a day after driving attempts had failed. Some antelope that frequent the Irrigation Project have developed the ability to jump. Jumping fences appears to be done most often by bucks, less frequently by does and almost never by fawns. When alarmed or pursued, very few antelope will jump a fence. Some will run into the fence, but most run parallel to the fence.

2. White Acorn Allotment fence on the south side of the Sweetwater River and west of Highway 28.

This is a 3-strand barbed-wire fence with 16-18 inch bottom clearance. This fence has been in use since 1972. Antelope moving from Area 65 toward winter ranges in the Farson Area cross the Sweetwater River immediately west of Highway 28. A cattle guard lies in the fence corner about 1 mile west of Highway 28. Antelope in November of 1975, 1976, and 1977 began accumulating along this fence. Gates along the fenceline were opened and the antelope moved toward the winter range. Gates were left open in 1975 and 1977 to accommodate antelope return movement in the spring. In the spring of 1977, antelope did not cross the fence and move back across the Sweetwater River until gates were left open. In the spring of 1978, the fenceline was walked and it was observed that antelope moving back to Area 65 all crossed the fenceline by going through open gates. No jumping of the cattleguard was noted, nor was there movement under the fence.

3. Highway 187 right-of-way fence north and south of Farson.

This is a net wire sheep-tight fence. South of Farson the right-of-way fence has precluded free movement between antelope critical winter range segments east and west of the highway. In the spring in some years antelope are trapped in the highway right-of-way. Antelope seeking newly emerging green grass and forbs are attracted to green forage along the highway through open gates, holes under fences and in a few instances, over fences. Vehicle traffic coupled with the net-wire fences panic the antelope. In such cases, constant patrolling is necessary and much time is spent chasing antelope back to open range. Antelope highway mortality increases as a result. Two sets of opposing let-down panels were constructed in 1977 by the Wyoming Highway Department at milepost 20 and 24 to better accommodate antelope movements and help alleviate entrapment problems.

North of Farson, the right-of-way fence has also precluded movements between summer and winter ranges east and west of the highway and has restricted the mobility of antelope during north-south migrations in the spring and early winter period. Let-down panels were installed at intervals on opposing sides of the highway fence between the north end of the Irrigation Project and the Big Piney cut-off road. When winter storms and snow accumulation force a movement of antelope from ranges north and east of the highway to more southerly ranges, the panels are dropped. In the last three winters the panels were dropped only once, in late January, 1978, to accommodate an antelope movement.

A dye-marking study to monitor antelope movements in the winter of 1973-74 indicated that antelope utilized the drop panels in their movement to winter range. In the spring, however, when forage conditions and inclement weather did not force movement, many of the same marked animals followed the fence-line north. When they reached the laydown panels, they continued moving and ended up north in another management area (Julian, 1974).

4. Highway 28.

These are three-and four-strand barbed-wire fences with 16-18 inch ground clearance. Antelope movements from intermediate winter range north and east of Farson to critical winter ranges did not occur until February 10-18, 1978. During this mass movement of antelope along both sides of Highway 28, drifting, crusted snow conditions prevented use of forages on intermediate winter range. During this movement, a photograph (Fig. 3) was taken of the approximate distance between the crusted snow surface and the bottom wire of the three-strand barbed-wire highway fence on the north side of Highway 28 at milepost 9.5. When the photo was taken, tracks of large numbers of antelope moving parallel to the highway fence were observed between milepost 18 and the fenced boundary of the Irrigation Project (Fig. 3). A large concentration of antelope (an estimated 1,500 to 2,000) was found at the east edge of the project and north of Highway 28. We opened gates at the bridge of milepost 6 and let antelope drift across the highway to the south within the fenced project boundaries. In the spring, some antelope crossed back through this opening and an estimated 700 to 1,000 antelope went east through open gates to open range in the Pacific Creek area. About 600 began drifting northeast up the fence-line on the south side of the highway. These antelope were stopped by a fence corner and could not be driven across the highway to the area from which they had originally come. We let down fence on both sides of the highway, to allow these antelope south of highway 28 to move north; but to little avail. As a result of the new fence on the south side of highway 28, winter distribution and subsequent summer distribution of these antelope will be markedly altered.

In summary, the antelope on these ranges are migratory. Higher elevations and areas with adequate water and available succulent spring-summer forbs are utilized as spring-summer-fall ranges by antelope. It is essential that antelope in these areas be able to move freely to lower winter ranges. Heavy snow accumulations and crusted, drifting snow, which are common to southwestern Wyoming, can make a seemingly passable fence impassable to antelope. Modification of pronghorn behavior to minimize the effect of fences is infeasible. "It cannot be assumed that pronghorns will adapt to changes in habitat resulting from livestock use or that they will learn behavior patterns that will permit them to thrive where their physical environment has been altered by fences" (unpublished Guidelines for the Management of Pronghorn Antelope, 1978). The pronghorn in the Sandy Area are in much demand as a resource and should be given consideration in all land management systems. Alteration of distribution on winter and summer ranges in the Sandy Area may be a more important result of fences on these antelope ranges than the direct mortality related to fences.

It is recommended that in the Sandy Area on antelope range:

1. Guidelines for livestock grazing systems and guidelines for fencing, in the

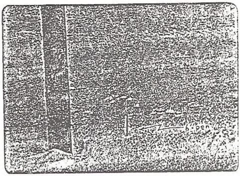


FIGURE 3. Deep, crusted snow conditions which prevailed and forced antelope onto critical winter range areas in early February, 1978, allowed a gap less than 6-inches for antelope movement (along the highway right-of-way fenceline on the north side of Hwy. 28). This fence was built to accommodate antelope with a 16-18 inch ground to bottom wire height.

1978 Guidelines for the Management of Pronghorn Antelope (as published by the Western States Pronghorn Antelope Workshop Committee), be utilized.

2. Fencing to accommodate only livestock grazing systems should not occur. A minimum amount of fencing should be constructed on those antelope ranges. Alternative grazing systems with minimum fencing which accommodate pronghorn and other wildlife should be employed. Wildlife in the Sandy Area should be recognized as a high priority resource and land management systems should provide for wildlife habitat needs.

3. The effect of large-scale fencing such as that proposed in the ES, on migratory antelope populations is poorly understood. However, as our previous examples have illustrated, the effect is likely to be detrimental. Consequently, any grazing system utilizing fencing should not be established on the scale of that proposed by BLM or by the operators for the Sandy. The cumulative effects of fencing (range, private, highway, industrial) coupled with mineral and oil-gas activities, increased recreational use, urban development, water resource development, agricultural and industrial developments will severely disrupt the continuity of wildlife habitat and may decrease wildlife diversity if land management systems do not recognize wildlife as a resource of high priority. The result of such an error in wildlife and land management will be decreased wildlife diversity, increased wildlife habitat degradation and decreased carrying capacity for wildlife. We do not feel that this is multiple-use management.

Pronghorn antelope in the Sandy Area should be granted a forage allocation in the Sandy Area based on:

a. Animal Unit Equivalent for Antelope of .10 or 9.4 antelope/AUM (Taylor, 1975).

b. As there are variations in antelope density on seasonal ranges in the Sublette, Dry Lake, and Red Desert Units between years, antelope densities based on the population objective for each herd unit over each seasonal range in the herd unit must be calculated (refer to Tables I and II). A forage allocation for antelope in the Sandy Area must be based on the calculated density for each seasonal range type in each of the antelope herd units occupying the Sandy Area. Summer range densities for the portion of the Sandy Area in hunt areas 91 and 96 can be calculated from data given in Note * at the bottom of page 3.

c. Period of Seasonal Range Use: Table II.

d. Period of competitive forage use and percent diet overlap (utilize long-term--at least five consecutive years--seasonal fecal analysis data, or data of comparable quality, to determine variation in diet overlap over time).

e. Livestock use of critical winter range should be minimized or excluded during periods of snow cover or poor grass and forb production between spring and fall.

f. Livestock or wildlife water should not be developed on critical antelope winter ranges.

g. Winter sheep use of antelope winter range is not desirable. However, moderate summer use by cattle does not reduce the carrying capacity of antelope winter range (Taylor, 1975). Existing water sources on antelope winter range should be shut-off and antelope excluded in the spring and early summer, then cattle can be allowed on the range and waters turned-on in mid-summer. Should such an arrangement cause a summer movement of antelope back to the winter range, then the water should be shut-off.

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ELK

Status

Elk occupy portions of the Sandy Area yearlong. The Prospect Mountain and Steamboat elk herds occur seasonally on a large portion of the Sandy. The Steamboat elk herd is unique in that it is one of the only deserr elk herds in North America. The Prospect Mountain herd unit consists of hunt areas 99 and 27 West. Hunt areas 100, 101 and 109 constitute the Steamboat herd unit. Since the preliminary draft ES was written, long-term data have been collected on seasonal elk distribution for these units. (Map 2 and Map 3). Information for the winters of 1973-76, 1976-77 and 1977-78 indicates that forage availability between winters in the Prospect unit dictates the choice of critical winter range, the portion of the critical winter range used, and the degree of movement of Prospect elk onto critical winter ranges in the Steamboat elk herd.

Population objectives for elk herds occupying the Sandy Area are based on herd units (Table III, Lockman, 1978, and Herd Unit Status Report, 1978). An evaluation of available information on elk movements indicates an interchange of elk between the Prospect and Steamboat herds. More definitive data on the degree of interchange are necessary before herd unit redefinition. Elk population objectives will not be changed unless changes in carrying capacity of critical winter range justify such action and there has been implementation of methods to minimize livestock use of forage on important elk winter range sites.

TABLE III. Existing Populations and Population Objectives for Elk in those Herd Units Occupying Portions of the Sandy ES Area.

Herd Unit	Hunt Areas Comprising the Herd Unit	Existing Population Estimate (post-hunt, 1977)	Objective (post-hunt)	Management Strategy
Prospect Mtn.	99, 27W	500-750	1,000	stabilize
Steamboat	100, 101, 109	500	500	stabilize

The period of occupancy of seasonal elk ranges has varied over the last six years. The duration and intensity of winter dictates the length of time elk spend on the winter, winter/yearlong and critical winter range. (Table 4).

TABLE IV. Elk Seasonal Use in the Sandy ES Area (Approximate dates based on data collected between 1971 and 1978).

Seasonal Range	Seasonal Range Designation	Period of Use
PROSPECT		
Summer	Summer (S)	May 1 to May 15
	Winter/Yearlong (W/Y)	June 20 to Nov. 15
Note: At least 60% of the summer elk use occurs on the national forest.		
Parturition	Parturition (P)	May 15 to June 20
	Summer (S)	
	Winter/Yearlong (W/Y)	
	In parturition period	May 15 to June 20
Note: In the parturition or calving period, this range recieves the heaviest elk use. Most bulls and some non-pregnant females occupy adjacent summer and winter/ yearlong range in this period, some pregnant females calve in ranges other than parturition ranges.		
Intermediate Winter	Winter/Yearlong (W/Y)	
	Critical Winter (C/W)	
	Critical Winter Yearlong (CW/Y)	Nov. 15 to Jan. 1
Note: In "normal" snowfall years some elk, and in some years most of the elk on critical winter range in the Prospect Unit move south when forage becomes unavailable (by late January or early February), some critical winter ranges in the northern and eastern portions of the Steamboat herd unit. In the winter in the northern and eastern portions of the Steamboat herd unit. In the winter 1975-76, 150 to 250 elk moved south to mid-February and returned north of Nov. 28 in mid-April. In the mid winter of 1976-77, no elk moved south. In the winter of 1977-78, 350 to 450 elk moved south in late January and early February and returned north of May. 28 in mid-to late March).		
Critical Winter	Critical Winter (C/W)	
	Critical Winter/Yearlong (CW/Y)	Jan. 1 to May 1
Note: See note above.		
STEAMBOAT		
Summer	Summer (S)	
	Winter/Yearlong (W/Y)	
	Critical Winter/Yearlong (CW/Y)	June 20 to Nov. 1

Table IV (cont'd)

Seasonal Range	Seasonal Range Designation	Period of Use
Steamboat (cont'd)		
Parturition	Parturition (P)	May 1 to June 20
Intermediate Winter	Winter/Yearlong (W/Y)	
	Critical Winter/Yearlong (CW/Y)	Nov. 1 to Jan. 1
Winter	Critical Winter/Yearlong (CW/Y)	Jan. 1 to May 1

Continuity of unaltered native vegetation and physical features allow elk in these areas the flexibility to move seasonally. Distributions delineated on Maps 2 and 3 include known variations in seasonal habitat use by these elk between 1970 and 1978. Numbers of elk occupying specific winter ranges vary with population size and the severity and duration of winter weather.

Habitat Requirements and Management for the Maintenance of Elk Herds in the Sandy Area.

The following habitat requirements are necessary for the maintenance of desired elk population levels in the Sandy Area.

Winter range habitat requirements:

Elk utilizing winter ranges north of Highway 28 require windswept ridges and southern exposures for feeding (the divide along the southeast end of the Prospects, southerly-running ridges in the Monument Draw area and the breaks along the north side of the Sweetwater River). Bedding cover on open southerly exposures and in drainages with stands of basin and mountain big sagebrush is used in cold, windy periods. Along the Sweetwater breaks, elk utilize stands of conifers on northern exposures and river bottom willows for bedding. When forage is unavailable on important feeding sites, elk move into the Little Sandy River-Upper Dry Sandy Area and onto critical winter ranges in the Steamboat Unit. In "normal" snowfall years some elk, and in some years most of the elk on critical winter range in the Prospect herd move south onto critical winter ranges in the northern and eastern portions of the Steamboat herd. In the winter of 1975-76, 150 to 250 elk moved south in mid-February and returned north of Highway 28 in early to mid-April. In the mild winter of 1976-77 no elk moved south. However, in early June of that year single and small groups of adult bulls were observed moving up the Sweetwater Divide toward the mountains by 6 & 7 personnel and a few local people. In the winter of 1977-78, 350 to 450 elk moved south in late January and early February and returned north across Highway 28 in mid- to late March. Elk wintering near the confluence of the East Fork of the Sweetwater and the Sweetwater River (about 70 head) in 1977-78 had not left this area by late-February and apparently

31d

MAP 2.

ELK-PROSPECT
79.270

Updated 6/14/78
By B.L.

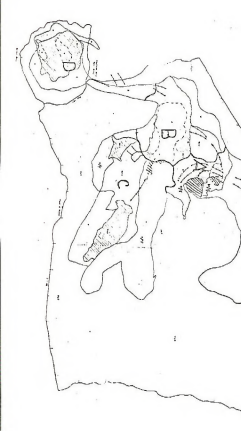
SCALE: 1:500,000
LEGEND: SEE APPENDIX I

remained in the area the entire winter. In the winter of 1971-72 (Long, 1976) almost all of the elk from the Prospect herd moved south onto Steamboat herd winter ranges, except for 50 head which moved onto the Little Sandy River between the Spicer Ranch and Squaw Teat. In the 1960's there were winters when some Steamboat elk moved into the Eden-Farson agricultural project to winter and caused degradation problems on local haystacks. An evaluation of winter elk movements in the Prospect herd since 1971-72 indicates that in severe winters some elk move into the Steamboat herd unit and some move onto the Squaw Teat-Little Sandy-Upper Dry Sandy critical winter range. In the Squaw Teat-Little Sandy-Upper Dry Sandy area, winter elk use may be in direct competition with mule deer. In mild winters a small number of elk will winter on ridges in the Sweetwater Breaks. It appears that insular cover is limiting and that the relative lack of insular cover on ridges southeast of Big Prospect Mountain precludes use of these areas in late winter. Thus, a lack of vegetative and physical cover combined with drifting, crusted snow conditions which make forage unavailable, forces a movement of Prospect elk onto winter ranges in the Steamboat herd unit and the Little Sandy area, which offer available forage and insular cover. The insular cover and shrub forage availability is sufficient for the small number of wintering elk along the Sweetwater River in most years.

On the Squaw Teat-Little Sandy winter range, Wyoming big sagebrush, basin big sagebrush, black sagebrush and willow are the plants most available to elk and mule deer. Along the Little Sandy River, elk prefer to bed in willow and basin sagebrush cover. Forage preference by elk in the Squaw Teat area in winter is unknown but is assumed to be mainly shrubs, as grasses are mostly unavailable (Lockman, 1976, 1977, 1978; Herd Unit Status Report, 1978).

In the Steamboat herd, elk move south and east from the Aspen-Pacific Butte, Alkali Wash and upper Rock Cabin Creek areas onto critical winter range in Parnell Creek Basin, south of Jack Morrow Creek, on lower Rock Cabin Creek and in the Alkali Creek area between Freighter Gap and Bar-X Ranch. On these critical winter ranges elk feed on grasses exposed on wind swept ridges, steep south slopes and in sheltered drainage basins (e.g. Parnell Creek) where forage is available. On these ranges elk prefer to bed in draws, sheltered bottoms and southern exposures in dense stands of basin big sagebrush and/or other shrubs. The prevailing winds in the Prospect and Steamboat Units are from the west so eastern exposures (leeward) are generally drifted with deep snow and unavailable to elk in most winters. Elk from the Prospect herd which winter in the Steamboat herd utilize ranges between Rock Cabin Creek and the Bar-X Ranch in close association with Steamboat elk.

Elk in the Steamboat Rim, Lenox, Loco Butte and Sands area winter from the western slope of Loco Butte and Essex Mountain to Buffalo Hump and between Loco Butte and Steamboat Rim in the sand dune area. Winter elk use of Steamboat Rim has decreased in the last five years. Records, prior to the past three years, indicated that elk spent the entire winter on ridges along Steamboat Rim. Increased horse numbers and intensive cattle use on the north side of the Rim has decreased forage for elk in winter. In the last three winters, including the mild winter of 1976-77, most of the elk moved off the Rim through Johnson Gap and Indian Gap by early February and into the Steamboat Mountain-Freighter Gap-Black Rock area to the east and the Essex Mountain-Loco Butte area to the west. On these winter ranges elk utilize stands of basin big sagebrush as cover for bedding. Grasses on wind-blown ridges, southern and western exposures and in basins are used as forage. Coop (1971), Black (1976),



Beall (1970), and Allen (1976) have all documented the importance of insular cover and available forage on elk winter range. The greatest habitat similarities between Steamboat (desert) and Prospect elk are displayed on the winter range.

Summer Range Habitat Requirements:

In March and April, Prospect elk follow the receding snowline from shrub-grass winter ranges onto aspen-sagebrush-conifer ranges at the base of the Wind River Mountains. These elk utilize aspen-sagebrush plant associations close to water for calving. After calving, elk disperse throughout the summer range as the snowline recedes. The general movement is up. On summer range, elk prefer heavy coniferous cover for bedding and small wet meadow for feeding (black et. al., 1976; Herd Unit Status Report, 1978). By early September, high mountain meadow forage is curing and elk seek feed on drier shrub-grass sites adjacent to aspen or conifer cover. Elk in the Steamboat herd have similar preferences but have substituted basin big sage, less aspen and topographical relief for the conifer and aspen cover utilized by mountain elk from spring through fall. Steamboat elk utilize stands of basin big sagebrush and aspen close to water for calving and select sites which are relatively undisturbed by man. Roberts (1976) and Phillips (1956) are two of many investigators who have documented the importance of calving cover to elk.

The following is a general description of elk calving areas and requirements for the Prospect and Steamboat elk herds (Lockman, 1976, 1977, unpublished field notes):

Prospect Mountain Calving Area - General Site Description

1. Area of gradual slope, often along drainages or near seeps and springs.
2. Irregular edge of aspen adjacent to shrub cover.
3. Juxtaposition of aspen or willow on moist sites with sagebrush on dry to moist sites.
4. Water and succulent forb-grass forage close to cover, usually within 50 meters.
5. Aspen stand with boulders, fallen logs and/or scattered shrubs in the understory as disruptive cover for calf concealment; sometimes in close proximity to mixed aspen-conifer stands.

Steamboat Unit Calving Area - General Site Description

1. Area of gradual slope, often slopes of draws or basins and often in the bottom of a drainage.
2. Close to water and succulent forage when possible, but farther than 200 meters where cover is sparse.
3. Dense, irregular shaped stands of basin big sagebrush or aspen with adjacent low growth forms of sagebrush and/or other shrubs.

4. Sagebrush and aspen stands often with much log and branch litter in the understory as disruptive cover, or sometimes with an understory of lower growth forms of shrubs.

Steamboat elk rely greatly on the basin big sagebrush in summer and winter for its cover value.

Criteria for optimum water distribution on summer desert elk range have not been established. However, in the summer, elk are generally found near permanent, good quality water sources. Rough, broken topography and stands of basin big sagebrush on sandy soils and in drainage bottoms provide escape cover and concealment.

Systematic observations of cattle and elk on elk summer range in Montana indicated a significant tendency for elk to avoid cattle (Allen, 1976). Observations by Lockman (1976 and 1977) in the LaBarge Creek area indicate the same reaction by elk to sheep and cattle occurs to some degree on that summer range. However, these elk usually had a suitable escape area. In the Steamboat herd, elk are often observed feeding with or near a band of feral horses. They are seldom observed feeding near cattle or sheep. In recent years the greatest summer concentration of Steamboat elk has been seen in the non-use livestock allotment from Dragon and Pacific Buttes to Lower Rock Cabin Creek. We believe that the increased numbers of desert elk in recent years are related to availability of water and spring-summer grasses and forbs on the non-use livestock allotment. This non-use area also provides an ample supply of winter elk forage. As a result, this area has been very important to wintering Steamboat and Prospect Mountain elk. Fetal losses in this area also utilize the grass-forb forage. The widespread distribution of habitat, habitat features, habitat continuity and the livestock non-use allotment have all played an important role in yearlong maintenance of the Steamboat elk herd in the face of increased human activity in their range.

The influence of fences on elk distribution and behavior is poorly understood. Numerous accounts of fence-related mortality of elk have been observed in Wyoming. At traditional elk crossings on some highways, Game and Fish Department-placed elk winter ranges, 38-inch high poled-top fences have been constructed to minimize fence entanglement by deer and elk. However, elk mortality from fence entanglement undoubtedly occurs less often than that of deer and antelope.

In winter, elk consume available grasses and some shrubs (Mackie, 1970; Boyd, 1970). Olsen and Hansen (1977) determined the grasses important to elk wintering on portions of the Steamboat range in one year. In most years grasses are available (on sites previously described) on the Steamboat elk winter range if summer livestock use has not decreased the forage for elk. Ward (1971) indicated that the importance of sagebrush as forage for wintering elk in southern Wyoming may be underestressed and that knowledge of sagebrush importance to elk in winter is lacking. In both the Steamboat and Prospect elk herd units there are winters when deep or crusted snow precludes use of grasses by elk. In these winters elk have to shift their diet to available shrubs including sagebrush, mountain mahogany and willows. Elk are better competitors for winter forage than deer because they have this ability to shift their diet when preferred species become unavailable. Winter forage is utilized by elk until spring forbs become available. Forbs, wet meadow grasses and grass-like species

constitute the bulk of elk forage from spring green-up through the curing of forage in mid-to late summer on most Sandy elk ranges. Fine-stemmed grasses on drier range sites generally constitute the bulk of the elk diet in fall, with forbs and shrubs comprising a minor portion of the diet.

Habitat Management Requirements for the Maintenance of Elk in the Sandy Area

1. Elk in the Sandy Area should be granted a forage allocation and a winter range forage reservation based on the following factors:

   a. Animal Unit Equivalent for elk of .50 or 2.0 elk/AUM (King, 1967).

   b. Forage allocation for elk based on the following updated calculations for the Prospect and Steamboat herds identified on Maps 2 and 3.

      1) Estimated numbers of elk occupying seasonal ranges on BLM lands in the Prospect herd**:

         Summer Range (Summer and Winter/Yearlong) 200 to 300 elk

         Parturition Range (Critical Parturition) 600 to 1,000 elk

         Intermediate Winter Range (Non-critical Winter and Winter/Yearlong and Critical Winter, Winter/Yearlong) 600 to 1,000 elk

         Critical Winter Range (Critical Winter and Winter/Yearlong) 200 to 500 elk**

         **In most years since 1972 an estimated 50 to 75% of the Prospect elk have spent the most intense portion of each winter on Steamboat Unit Critical Winter Range (Area A in Map 3).

2. See Table IV for periods of seasonal range use.

3. Summer Range Forage Allocation - $\frac{300 \text{ elk}}{2 \text{ elk/AUM}}$ = 150 AUM

   150 AUM x 5.5 months = 825 AUM's

   Parturition Range Forage Allocation - $\frac{1,000 \text{ elk}}{2 \text{ elk/AUM}}$ = 500 AUM

   500 AUM x 1.0 months = 500 AUM's

3. Cont'd.

   Intermediate Winter Range Forage Allocation -

   *** To encompass variations in elk numbers between years on winter ranges and considering desired levels, the maximum number should be used for an AUM reservation.

   $\frac{1,000 \text{ elk}}{2 \text{ elk/AUM}}$ = 500 AUM's

   500 AUM x 1.5 months = 750 AUM's

   Critical Winter Range Forage Allocation - *** $\frac{500 \text{ elk}}{2 \text{ elk/AUM}}$ = 250 AUM's

   250 AUM x 4.0 months = 1,000 AUM's

   *** To alleviate problems of elk competition with deer on the winter range in the Squaw Tout-Little Sandy area, critical winter forage for at least 500 elk should be reserved in the Prospect Unit. This may be an option to management of elk winter range, but should not be exercised unless measures are taken to minimize livestock use on critical winter ranges in the Steamboat Unit during the spring through fall period.

   c. Elk Forage Reservations for the Steamboat herd

      1) Estimated numbers of elk occupying seasonal ranges on BLM lands in the Steamboat Unit:

AREA A		
Summer	(Summer, Winter, Critical Winter/Yearlong, Non-Critical Winger/Yearlong)	250 to 400
Parturition	(Critical Parturition)	250 to 400
Intermediate Winter	(Winter, Winter/Yearlong, Critical Winter/Yearlong)	250 to 400
Critical Winter	(Critical Winter/Yearlong)	250 to 400 plus 400 to 600* 650 to 1,000

*This figure includes ingress from the Prospect herd.

AREA B		
Summer	(Summer, Winter/Yearlong)	150 to 250

Area B (cont'd)		
Parturition	(Critical Parturition)	150 to 250
Intermediate Winter	(Winter, Winter/Yearlong, Critical Winter/Yearlong)	150 to 250
Critical Winter	(Critical Winter/Yearlong)	150 to 250
AREA C		
Summer	(Summer, Winter/Yearlong, Critical Winter/Yearlong)	20 to 30
Winter	(Winter, Winter/Yearlong, Critical Winter/Yearlong)	25 to 100
AREA D		
Winter and Summer	(all ranges)	50 to 100

   2) See Table IV for periods of seasonal range use.
   3) Forage Allocation Calculations

AREA A

Summer Range Forage Allocation - $\frac{400 \text{ elk}}{2 \text{ elk/AUM}}$ = 200 AUM's

200 AUM x 4.5 months = 900 AUM's

Parturition Range Forage Allocation - $\frac{400 \text{ elk}}{2 \text{ elk/AUM}}$ = 200 AUM's

200 AUM x 1.5 months = 300 AUM's

Intermediate Winter Range Forage Allocations - $\frac{400 \text{ elk}}{2 \text{ elk/AUM}}$ = 200 AUM's

200 AUM x 2 = 400 AUM's

Critical Winter Range Forage Allocation - $\frac{1,000 \text{ elk}}{2 \text{ elk/AUM}}$ = 500 AUM's

500 AUM x 4 months = 2,000 AUM's

AREA B

Summer Range Forage Allocation - $\frac{250 \text{ elk}}{2 \text{ elk/AUM}}$ = 125 AUM's

125 AUM x 4.5 months = 562 AUM's

Parturition Range Forage Allocation - $\frac{25\text{-} \text{ elk}}{2 \text{ elk/AUM}}$ = 125 AUM's

125 AUM x 1.5 months = 187 AUM's

Intermediate Winter Range Forage Allocation - $\frac{250 \text{ elk}}{2 \text{ elk/AUM}}$ = 125 AUM's

125 AUM x 2 months = 250 AUM's

Critical Winter Range Forage Allocation - $\frac{250 \text{ elk}}{2 \text{ elk/AUM}}$ = 125 AUM's

125 AUM x 4 months = 500 AUM's

AREA C

Summer Range Forage Allocation - $\frac{50 \text{ elk}}{2 \text{ elk/AUM}}$ = 25 AUM's

25 AUM x 6 months = 150 AUM's

Winter Range Forage Allocation - $\frac{100 \text{ elk}}{2 \text{ elk/AUM}}$ = 50 AUM's

50 AUM x 6 months = 300 AUM's

AREA D

Summer Range Forage Allocation - $\frac{100 \text{ elk}}{2 \text{ elk/AUM}}$ = 50 AUM's

50 AUM x 6 months = 300 AUM's

Winter Range Forage Allocation - $\frac{100 \text{ elk}}{2 \text{ elk/AUM}}$ = 50 AUM's

50 AUM x 6 months = 300 AUM's

2. A forage allocation for critical and non-critical elk winter ranges will not necessarily insure that summer-fall livestock use will leave adequate forage available to elk in winter. Therefore, the following considerations should be given to summer-fall livestock use of elk winter range:

a. Summer-fall and winter livestock use of elk winter range, especially critical winter range, should be minimized to provide adequate available forage for elk on important feeding sites.

b. Water should not be developed on critical elk winter ranges for use by livestock in summer or fall.

c. Cattle should be herded in order to ensure better distribution and prevent concentrations of livestock on elk winter range.

3. Existing stands of basin big sagebrush in both elk herds must be maintained to provide yearlong escape cover for elk and to provide calving cover for the Steamboat herd.

a. Trend of vegetation used as cover should be monitored on all important elk use areas.

b. In cases of elk cover deterioration, the causative agent should be removed or the habitat improved.

4. Aspen stands in foothill ranges and within the Steamboat herd are in advanced stages of succession. Increased cattle use will result in accelerated deterioration of aspen and riparian habitats important to elk.

a. Measures should be implemented to regenerate 5,000 to 8,000 acres of aspen-conifer and aspen-sagebrush associations over the next 20 years, using controlled burning and small irregular block cuts in aspen.

b. Cattle use of aspen and riparian willow habitats should be decreased. Herding and fencing may be required to reduce livestock use in the upper Big Sandy, upper Little Sandy and upper Sweetwater River drainages.

5. Forbs and wet meadow plants are important to elk in spring and summer. Excessive cattle grazing and trampling of wet meadow forage in summer causes deterioration of plants, decreased soil moisture, decreased grass and forb cover and a shift to shrub vegetation or more xeric conditions. This problem can be alleviated by:

a. Fencing the source of water and the storage reservoir and providing a spill pipe below the reservoir as a livestock water source. This will retain succulent vegetation for elk and food and cover for small wildlife species.

b. Minimizing summer livestock use of important elk summer concentration areas, where juxtaposition of water is an important component of their habitat.

c. Fencing of permanent water sources on important elk summer concentration areas to exclude most cattle use in late summer may be necessary in the upper Alkali Wash, upper Rock Cabin Creek, Joe Hay Rim and Parnell Creek areas to minimize livestock impacts on elk summer and winter range.

6. In the summer elk tend to avoid areas occupied by cattle and/or sheep. With activation of the non-use allotment and failure to implement measures to minimize livestock use on elk winter/yearlong and important summer range, we anticipate a decrease in elk winter forage availability and resultant decreases in elk numbers through avoidance and displacement and/or a summer-winter range carrying capacity reduction. We offer the following options for consideration of elk and elk habitat in any grazing management plan for the existing non-use allotment in the Jack Morrow Creek-Rock Cabin Creek-Alkali Wash-Oregon Buttes portion of the Steamboat Allotment:

a. Maintain livestock non-use and utilize these areas for feral horses, elk and other wildlife -- optimize the wildlife habitat value of non-use allotments.

b. Activate non-use and allow conversions from sheep to cattle AUM's. Minimize livestock use of elk summer and winter range on the critical winter/yearlong range in Area A of the Steamboat Unit by fencing waters to exclude livestock, by developing livestock waters off critical winter/yearlong range in Area A and by herding.

c. Remove all feral horses from conversion areas or activated non-use allotments where they would compete with elk for forage. Increased cattle use in the Steamboat Unit would also increase the degree of competition between feral horses, elk and cattle for forage important to elk in the winter.

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SAGE GROUSE

Status

The sage grouse population in the Sandy Area has been relatively stable over the last 20 years. Harvest data for Sweetwater County suggest that annual variations in harvest are related to variations in production and brood survival. Decreases in breeding habitat occurred in and around the Eden-Farson Irrigation Project as a result of sagebrush control activities in the 1950's and 1960's. A history of known past and present strutting grounds and breeding areas for southwestern Wyoming compiled in 1978 includes the Sandy Area (Strutting Ground Inventory and History for District IV, Wyo. G. & F., Green River, attached as Appendix 2). Sage grouse seasonal range maps available from the Wyoming Game and Fish Department include the Sandy Area. In 1978 a systematic aerial search for new strutting-breeding complex locations was initiated.

Habitat Requirements and Management of Sage Grouse Populations in the Sandy Area

Patterson (1952: 203) found that sagebrush comprised greater than 80% of the fall, winter and early spring diet of sage grouse. Forbs were the dominant forage in late spring and summer. Sage grouse chicks are heavily dependant upon insects through 4 to 6 weeks of age and on forbs from 6 to 12 weeks. According to K. Bagdonas, Univ. of Wyo., entomologist, insect production on arid shrub ranges in southwestern Wyoming is highly dependant upon spring moisture and the production of succulent forbs and grasses. Riparian and wet meadow sites with good vegetation production are important for producing insects and forbs essential to the young, rapidly growing sage grouse in dry summers.

Of 300 sage grouse nests found by Patterson (1952), 92 percent were under a sagebrush canopy. Braun et. al. (1977) evaluated the results of several investigations of sage grouse habitat and indicated that the distance of nests from leks (strutting grounds) varied with the proximity of leks to quality nesting habitat. The lek-to-nest site distance varied from 12.9 km (encompassing all nesting) to 3 km (encompassing at least 75% of the nesting). Sagebrush heights used at nesting sites vary from 17 to 79 cm, with most nests located under the tallest bushes available (Patterson, 1952; Braun et. al., 1977). Stands of 20-40 percent canopy coverage are most frequently used for nesting. Successful sage grouse nests are found in significantly greater sagebrush canopy cover than unsuccessful nests (Wallestad and Pyrah, 1974).

Autenrieth (1976), Gill (1965), Wallestad (1971), Klebenow (1969), and Oakleaf (1971) have all found that sage grouse broods use more open stands of sagebrush in early summer and as summer progresses either move upward in elevation following a gradient of green food plants or to riparian zones, wet meadows or lower mountain meadows. As summer ends and fall begins, broods become more dependant upon dense sagebrush. In the Sandy Area, sage grouse broods depend upon rangeland forb and insect production early in the summer. In mid- to late summer they depend upon wet meadows, riparian habitats, irrigated haylands, pastures, and foothill mountain meadows with sagebrush and water in close proximity.

In dry summers sage grouse require some free water. Water sources spaced at 1½ mile intervals on arid summer sage grouse range are regarded as optimum for population

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maintenance. Dense stands of basin big sage or mountain big sage in draws or basins close to water offer good late summer and early fall cover for sage grouse in the Sandy Area. Emergent aquatic plants, grasses, forbs, and shrubs along the shoreline of an aquatic system offer protective cover for sage grouse as well as a food supply of plants and insects.

In the Sandy Area sage grouse move variable distances from summer to winter range (Patterson, 1952). In winter sage grouse utilize sagebrush stands with greater than 20 percent canopy coverage (Eng and Schladweiler, 1972; Wallestad, 1975).

Habitat maintenance and improvement projects on riparian and wet meadow sites should be implemented where deteriorating conditions exist. Sites which are presently good quality wildlife habitat should be maintained.

Guidelines for the maintenance of sage grouse habitat (Braun et. al., 1977) should be followed in the Sandy Area in designing livestock grazing systems and range management practices.

Range vegetation objectives should be designed with sage grouse habitat requirements in mind.

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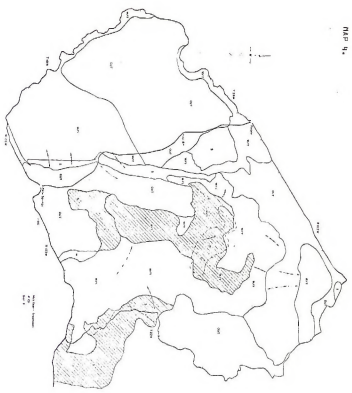
MAP 4.



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MAP 5.

MULE DEER

Status

The Sandy Area includes portions of the Steamboat and Prospect Mountain mule deer herds. The Steamboat herd consists of hunt area 131 and the Prospect Mountain herd consists of hunt areas 130 and 93.

The desired post-hunt population level for the Prospect herd is 6,000 deer. Recent evidence indicates that the boundaries of this herd are not adequately defined. However, redefinition of the geographical limits of this herd will require collection of long-term movement data. Data from the last three winters indicate that a significant portion of the deer wintering in the Prospect herd come from hunt area 138, north of the Big Sandy River. Many of the deer from area 138 winter in the East Fork area. Redefinition of herd unit boundaries awaits a determination of the geographical separation of winter migrations in area 138. Present populations of wintering Prospect deer in the Sandy Area are at or near population objectives. There is very little interchange of deer between the Prospect and Steamboat herds.

The desired post-hunt population level for the Steamboat herd is 2,500 mule deer. The 1977 post-hunt population estimate for this herd indicated that the population objective would be attained post-hunt, 1978. Population data presented here were obtained from Lockman's 1976, 1977, 1978 Herd Unit Completion Reports and 1978 Herd Unit Status Report.

Maps 4 and 5 illustrate the current seasonal distribution of mule deer in the Steamboat and Prospect herds, respectively. More data on winter range use is necessary to more adequately delineate intermediate and critical winter ranges in these herds.

Until more specific seasonal range use data are collected, the following are approximate lengths of seasonal range use for these herds.

TABLE V. Approximate Seasonal Range Use by Mule Deer in the Prospect and Steamboat Herds.

Seasonal Range	Seasonal Range Designation	Period of Use
PROSPECT UNIT		
Winter	Winter, Winter/Yearlong, Critical Winter and Winter/Yearlong	Nov. 1 to May 1
Summer	Winter/Yearlong, Critical Winter/Yearlong, Summer	May 1 to Nov. 1
STEAMBOAT UNIT		
Winter	Winter/Yearlong, Critical Winter/Yearlong	Nov. 1 to May 1

Table V. Cont'd.

Seasonal Range	Seasonal Range Diserthution	Period of Use
Steamboat Unit (cont'd)		
Summer	Summer, Critical Summer, Winter/Yearlong, Critical Winter/Yearlong	May 1 to Nov. 1

Fawning ranges have not been defined in most areas of these herds. It appears that mule deer on these ranges may not use historic parturition areas, and that fawning is widespread throughout the summer range. In the Steamboat herd there may be specific parturition areas due to the juxtaposition of forage, cover and water only on certain portions of the summer range. On the summer range of the Prospect herd, preferred fawning areas are widely available to deer.

Habitat Requirements and Management for the Maintenance of Mule Deer Herds in the Sand:

In fall and winter, mule deer utilize primarily shrub forage (Kufeld, 1973). Anderson and Wilbert (1958) and Blair (1967) found that deer in the Kemmerer-Cokeville area relied largely on Artemisia tridentata and Artemisia nova forage from mid - through late winter. These investigators also noted the importance of taller growth forms of big sagebrush (apparently, basin and mountain big sage) as insular cover and as forage in periods of low forage availability. On winter ranges of the Prospect ecotone, bitterbrush and big sagebrush are dominent on upper elevation wintering sites, while wyoming big sage, basin big sage, black sage, and willow are dominent shrubs on lower, more critical deer winter range. In the late winter of 1977-78, Lockman (1978) observed extensive utilization of black sage and Wyoming big sage by deer in the Little Sandy-Stump Seat wintering sites. In the Steamboat herd, deer winter on basin big sage - bitterbrush, basin big sage-bitterbrush-serviceberry, basin big sage-lower sagebrush growth forms and Juniper-big sage-bitterbrush shrub associations. Kufeld (1973), summarized the reports of several investigators, documented the importance of forbs to mule deer on spring-summer range.

In both herds deer prefer southern and western exposures and wind-sheltered basins for feeding and resting (Lockman, 1977; 1978). To maintain mule deer populations in the Sandy Area, existing shrub densities should be maintained. Livestock use of shrubs important as forage and cover for deer in winter should be minimized. Livestock should not be allowed to use critical deer winter range in periods when livestock forage is unavailable or in short supply. Where spring, through fall livestock use of shrubs on deer winter range exceeds 30% of the current year's growth, livestock should be removed from the deer winter range. This should be monitored annually.

Low water availability appears to limit mule deer summer distribution on some portions of the Steamboat range. Additional water developments for livestock and wildlife will better distribute mule deer in summer and lessen the detrimental affects of livestock use of winter mule deer habitat.

Vegetation associated with seral aspen communities is important to mule deer from

spring through fall. Seral aspen communities, riparian habitat and wet meadow sites provide forb and grass forage essential to the female late in gestation and in lactation (Schneegas, 1977). In the Sandy Area range management objectives should include forage requirements of mule deer. Forb composition on mule deer summer ranges should be at least 20% of the plant composition. On non-critical winter/yearlong and summer ranges, cattle use should be deferred or minimized in the period of forb growth, especially between Prospect Mountain and the Lower Wind River Mountains. All deteriorated riparian habitats and riparian habitats with a downward trend in shrub cover should be protected from over-use and accelerated deterioration by livestock. Measures and Little Sandy drainages upstream from the irrigation project. On aspen and aspen-conifer habitats which are advanced successionally, long-term habitat improvement should be implemented livestock use minimized on each improvement site for one year following reclamation measure. All wildlife habitat with potential for improvement should be delineated and a long-term wildlife habitat improvement program implemented.

Fences have been shown to cause mortality to mule deer throughout Wyoming, especially those fences which occur on winter ranges or intercept migration routes. Fences causing least mortality to mule deer appear to be pole and log fences and barbed-wire fences with a maximum height of 38 inches and a minimum of 12 inches between the top two wires. Well maintained, tight fences are less detrimental than poorly maintained, loose fences. Any new fencing employed on mule deer range should comply with BLM fencing policy for mule deer and antelope ranges.

Mule deer in the Sandy Area should be granted a forage allocation based on:

a. Animal Unit Equivalent for Mule Deer of .20 or 5.0 deer/AUM (Stoddart, L.A. and A.D. Smith. 1955. Range Management. 2nd Ed. McGraw-Hill Book Co., Inc.)

b. As there are variations in mule deer density (mule deer/unit area) on seasonal ranges in the Steamboat and Prospect Units between years, mule deer forage allocations must be based on population objectives for each herd and each seasonal range in a herd unit. A forage allocation for mule deer in the Sandy Area must be based on the calculated deer density for each seasonal range type in each of the mule deer herd units.

c. Competitive seasonal forage use and percent diet overlap (utilize long-term data - five consecutive years of seasonal fecal analysis or data of comparable quality - to determine variation in diet overlap over time).

d. Seasonal Range Use - Table V.

e. Use of critical deer winter range by cattle and other livestock should be minimized or excluded during periods of snow cover or poor grass and forb production from spring through fall.

f. Winter sheep use of mule deer winter range is not desirable, but moderate summer use by cattle is not detrimental to the carrying capacity of the mule deer winter range.

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MOOSE

Status

The Prospect Moose Herd primarily occupies the north and east portion of the Sandy (Map 6). The desired population level for the Prospect herd is 100 post-hunt. Post-hunt, 1977, there were an estimated 80-90 moose in the herd. Observation of moose movement suggests that there is an interchange of moose across the upper Sweetwater and upper Big Sandy Rivers (Lockman, 1977). A portion of the Upper Sweetwater moose herd (hunt areas 20 and 2) is also included in the Sandy, but population data for those units are not presented here.

Habitat Requirements and Management of Moose Populations in the Sandy Area

In winter, snow depth precludes the use of willow and aspen habitat north of Prospect Mountain, so moose move onto willow bottoms along the Big Sandy, Little Sandy and Sweetwater Rivers. Moose elsewhere utilize low-growing shrubs and riparian willows as forage in fall and shift to a diet of willows in the winter (Wilson, 1971; Houston, 1968). Riparian and wet meadow grasses, emergent equatics and forbs are important spring and summer forage for moose (Houston, 1968).

Willows in riparian zones and aspen and conifers adjacent to riparian habitat are used yearlong as insular cover by moose. Seral stages of aspen-conifer associes are used spring through fall (Wilson, 1971). In the Lincoln moose herd aspen-Cannothus associations receive a high degree of summer use and mountain shrub associes receive a marked amount of winter use by moose (Lockman, 1977, 1978).

Riparian willows in the Big Sandy, Little Sandy and Sweetwater drainages above Highway 28 and the Irrigation project have been deteriorated. Habitat improvement measures should be implemented on the upper portions of these dreinages to increase willow cover. Heavy utilization by livestock has largely contributed to this deterioration. Fencing of riparian zones to protect them from heavy livestock use and allow reestablishment of willow-shrub cover should be implemented on important segments of stream.

Aspen stands are in advanced stages of succession and being replaced by sagebrush and conifers. A long-term project to reestablish diversity of seral and advanced successional stages in aspen habitats on foothill ranges should be implemented. Habitat improvement will better distribute livestock use through increased forb and grass production. This would decrease the adverse impact of livestock use on riparian and aspen habitat types.

Forage should be allocated for moose yearlong according to the following factors:

a. 100 moose = 87 AUM
*1.15 moose/AUM

87 AUM x 12 months = 1,044 AUM's

* Stoddart, L. A. and A. D. Smith. 1955. Range Management. 2nd Ed. McGraw-Hill Book Co., Inc.

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b. As there are variations in moose density on seasonal ranges in the Prospect herd between years, moose densities should be based upon the population objective for each herd unit and each seasonal range.

c. Competitive seasonal forage use and percent diet overlap.

d. Seasonal range use--yearlong.

Summer	Summer, Winter/Yearlong Range	May 1 to Nov. 1
Winter	Winter/Yearlong, Critical Winter/Yearlong	Nov. 1 to May 1

e. Livestock use of critical winter range (riparian willow habitat) should be minimized or excluded yearlong.

Future determinations of carrying capacity of moose should be based on moose use of current willow growth. This should not exceed 50% on riparian transects. Transects should include those willows most extensively utilized by moose in winter. Use should be monitored annually.

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PART II - EVALUATION OF THE PROPOSED ACTION AND GRAZING ALTERNATIVES

The factors considered in this evaluation were as follows:

1. Grazing system type and application
2. Water developments
3. Fencing for livestock
4. Activation of livestock non-use
5. Livestock class conversions
6. Reduction or increase of livestock use

THE PROPOSED ACTION

This is an intensive livestock grazing system.

Significant Points for Consideration

1. An intensive livestock grazing system, geared for increased livestock production in the long-term
2. Grazing treatments are based on a rest-rotation (alternately grazed and deferred) grazing system
3. Treatment systems are geared for long-term decreases in shrub composition and increases in grass composition, or for long-term increases in livestock production, especially cattle
4. Water developments are planned to improve livestock use of the range and expand livestock summer range to presently unsuitable ranges
5. Large-scale fencing must be employed to effect the grazing treatments-536 miles of new fence proposed in addition to about 301 miles existing fence
6. Riparian habitat is afforded no protection under this action
7. Much of the existing non-use will be converted to cattle, especially in the Pacific Creek, Bush Rim, Steamboat, Red Desert and Little Colorado Allotments
8. Livestock Forage AUM's

	Cattle Production	Actual Use	Sheep Production	Actual Use
Existing Livestock AUM's (Table 2-24)	125,500	32,970	142,861	117,318
Livestock AUM's under Proposed Action for Long-term (Maximum)	454,681-cattle AUM's			
(Projected) (Table 3-14)	175,269-cattle AUM's			
Projected Use By Cattle (Table 3-15)	66,050	Projected Use by Sheep (Table 3-15)		59,466
Available Cattle AUM's	88,431	Available Sheep AUM's		78,119
Total Production for Cattle	172,833	Total Production for Sheep		196,049
Long-term Projected AUM Allocation for Wildlife and Wild Horses Under the Proposed Action (Table 3-15)	43,399 AUM's			
Current AUM's Used by Wildlife and Wild Horses (Tables 2-24 and 36) (As of 1976)	49,277 AUM's			

The effects of rest-rotation grazing on sagebrush grassland ranges in Wyoming have not bee fully evaluated. Although this procedure is recognized as a valuable tool for restoring deteriorated rangelands, it should be quantitatively evaluated in the specific climatic, edaphic and vegetative types in the Sandy ES Area. An allotment should be tested to determine the effects and effectiveness of this grazing system prior to any implementation of intensive grazing system requiring fencing as the major improvement practice. Of particular importance are cumulative effects of fencing and changes in the plant communities (the system is designed to decrease shrub cover and increase grass cover) on wildlife distribution, use, seasonal patterns and productivity.

Existing fenced-pasture grazing systems on the BQ Burnt Fork-Thomas Fork Allotments in the Kemmerer Resource Area have not been effective because of enforcement problems with operators utilizing the systems.

Vegetation management objectives of the Allotment Management Plans for the Proposed Action are to decrease shrub composition and increase grass composition on most of the allotments. This is to be accomplished in treated pastures by timing livestock grazing use with grass phenology instead of complementing shrub needs. This system would promote livestock use of less desirable plants, including shrubs, in grazed pastures. In years of low grass and forb production, utilization of shrubs

by livestock is anticipated to be markedly greater. Range Improvement Measures addressed in the AMP's actually involve shrub control. The importance of shrubs to major wildlife species in the Sandy Area is discussed in Part I of this review.

[1]Hormay (personal communication with District Fishery Biologist-BLM, 1976) stated that rest-rotation grazing systems would be detrimental to riparian areas and they should be fenced for protection. The proposed action does not recognize the need to protect riparian areas. Livestock conversions are generally acceptable in the Sandy if major wildlife habitat requirements are met and important riparian areas are protected (Wyoming Game and Fish Department Alternative No. 7 and Species Habitat Requirements and Management Recommendations).

Water developments as proposed on critical winter big game habitats, will be detrimental. Water developments on critical antelope winter range will encourage summer antelope use of winter range and increased livestock use of shrubs from spring through fall. Water developments on critical elk winter range will increase spring through fall elk, feral horse, and livestock use of forage important to elk in the winter, especially in periods of snow cover and low forage availability. Livestock use of critical big game winter forage and cover should be minimized to maintain available forage in severe winter periods (Part 1-Big game habitat requirements and habitat maintenance.) These proposals will maximize livestock use of critical big game range.

Proposed fencing will decrease the ability of the habitat to maintain desired big game populations. Presently, the Sandy is fenced on a low-scale. The 536 miles of proposed fencing will be nearly twice the current fencing. This is fencing on a large-scale. Fencing which bisects migration routes and/or critical winter range will adversely affect winter antelope distribution. Shrub composition on critical winter yearlong ranges utilized by sagebrush-dependent native wildlife will decrease under prescribed grazing treatments. Distribution of wildlife and wildlife habitat will be altered due to changes in forage availability and plant composition. There will be a decrease in carrying capacity for sagebrush-dependent wildlife. In areas such as the Little Colorado Desert, where pasture fences bisect antelope winter range, the adverse affects of decreased shrub composition, direct fence mortality and altered distribution to low-quality winter range will be massive due to the cumulative effect of existing fences and those proposed (refer to Antelope Habitat-Part I). Grazing systems employing fenced pastures on elk or deer winter range may result in excessive livestock use of elk or deer winter forage, especially in the Sandy where systems are designed to accommodate livestock needs and not wildlife. For example, the Little Sandy-Little Prospect Allotment pasture system was divided so that it will not rest at least half of the critical elk and deer range each year. In the Bush Rim, Pacific Creek, Sands and Steamboat Allotments, provision for critical elk winter range was not designed into the system.

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[1]Hormay, August L. BLM Range Management Specialist at Washington D.C. Telephone conversation 11 August, 1976 with Rock Springs District Fisheries Biologist concerning rest-rotation grazing management. As referenced in the Sandy ES.

At present there are about 77,000 livestock AUM's utilized on the Sandy. Activation of non-use following a wildlife forage allocation would increase utilization to about 138,000 livestock AUM's. The present carrying capacity is based on a 1964-65 Ocular Reconnaissance Survey. Prior to activation of non-use, new, long-term forage production and vegetation trend data should be collected and used to recalculate the carrying capacity for all major herbivores in the Sandy. At present, range areas under non-use provide much yearlong forage and cover for wildlife and wild horses. The Bush-Rim Allotment is largely non-use at present. This allotment provides a significant amount of winter elk forage and seasonal habitat for other wildlife. Elk and wild horses are major competitors for grasses and forbs and are greatly reliant on this area. Riparian habitat in this allotment has been largely unaffected by livestock due to the low intensity of livestock use. Activation of non-use in this allotment without implementation of measures to minimize livestock effects on critical wildlife range will decrease the carrying capacity for most wildlife species markedly. Elk will especially be affected. (Refer to Habitat Requirements and Maintenance Recommendations-Part I).

Although activation of non-use will be largely responsible for an estimated increase of approximately 61,000 AUM's, it appears that a portion of this increase is not due to activation of non-use, but to an unaccounted-for change in total AUM's. Competitive forage has been allocated for wildlife, but a forage allocation on critical winter range does not ensure that summer-fall livestock use of forage will leave adequate forage for use by elk in winter. See Part-I.

Tables 3-24, 27, 30 and 32 point out problems of availability related to production. However, environmental factors which reduce availability have been used very conservatively in construction of these tables. Critical winter habitats for moose and elk lack AUM's necessary for winter survival (see Big Game Habitat Requirements-Part I).

Palmer Draw Livestock Exclusion Area: Data on long-term elk winter use of this area is lacking. However, observations of snow conditions and exposed vegetation on slopes and ridges in the area during the winter of 1977-78 indicate that there is little forage available to elk by mid-winter on ridges and slopes on the north side of the Sweetwater River. In the winter of 1977-78 bare ridges on and adjacent to the Palmer Draw exclosure supported about 70 elk from late January through March. Based on winter forage availability in the exclosure, we estimate the maximum winter elk carrying capacity to be 70-100 elk for 2 months in the most severe portion of the winter. This estimates that in some years most of the elk's diet would be willows and other shrubs (Refer to Elk Habitat Requirements-Part I).

Sandy Area ranges are mostly in satisfactory to good condition, with riparian habitats deteriorating. Excellent range for livestock does not equal excellent range for wildlife. According to the SCS Guide to Range Site Classifications, sites classed as fair to good for livestock would better provide seasonal forage and cover requirements of native wildlife species, since most of these species are reliant on native shrubs on fall-winter range and forbs on spring-summer range.

Concern by the NRDC and others over the lack of wildlife resource consideration in livestock grazing management was the main reason for this and other grazing ES's. However, in this case range vegetation objectives were established primarily for livestock. In the AMP's wildlife habitat maintenance should be an integral part of

vegetation objectives on important wildlife ranges. However, the AMP's were based on improving livestock range. As a result they will only partially fulfill the habitat requirements of wildlife in the Sandy Area.

ALTERNATIVE NO. 1

Current Situation

Significant Points for Consideration

1. Present livestock grazing systems will be continued
2. Continue present management, except non-use would be activated. About 77,000 existing livestock AUM's plus about 61,000 AUM's non-use would result in about 138,000 AUM's
3. Only current temporary conversions would be allowed most activated non-use would be sheep use
4. No major additional water developments are planned
5. Forage allocated for wildlife and horses, as in P.A.
6. The only fencing designed for this alternative is a checkerboard boundary fence of three strand barbed-wire east of Highway 187 and four strand barbed-wire west of Highway 187

EVALUATION OF ALTERNATIVE NO. 1

Currently, there are conflicts in use between livestock and some big game species on critical winter range. Activation of non-use, especially on elk and pronghorn winter ranges, will increase the degree of existing conflicts. The increased concentration of livestock resulting from activated non-use will further deplete forage in already aggravated areas, and the limited water developments in this alternative will not alleviate this problem in areas like the Little Colorado antelope critical winter range and the Little Sandy-Squaw Teat-upper Dry Sandy-Elkhorn mule deer and elk winter range. Livestock water developments on pronghorn critical winter range promotes spring-summer-fall antelope use of winter forage (refer to Antelope-Part I). This is apparent in the Little Colorado and lower Pacific Creek portions of the antelope winter range. Summer-fall livestock use of critical elk winter range following activation of non-use would markedly decrease available forage for elk on winter ranges (refer to Elk-Part 1). This alternative does not include provisions to maintain big game critical winter range.

Alternative 1 does not provide for maintenance and improvement of riparian and wet meadow habitat important as sources of forage, cover and water for most wildlife occupying the Sandy (refer to Part I-Species Habitat Requirements).

Activation of non-use in this alternative would be primarily sheep use. Increased sheep use would result in more competition with antelope, sage grouse and mule deer and less competition with elk and moose. There would be less adverse impact to riparian habitat and critical winter ranges if these areas were used by sheep than there would be with increased cattle use, since sheep can more feasibly be herded in order to avoid critical wildlife ranges and deteriorated habitat. Without additional water developments we anticipate an increase in wildlife-livestock conflicts due to the concentration of livestock around water sources. This would cause displacement of wildlife and reduction in carrying capacity of the habitat when important seasonal wildlife ranges deteriorate from concentrated livestock use. Sheep bedding and herding activities may cause losses or displacement of sage grouse from breeding complexes, nesting areas, or similar wildlife ranges. However, these problems might be partially mitigated if sheep were herded in such a manner that deterioration and over-utilization of wildlife habitat is prevented (refer to Part 1).

Forage has been allocated for wildlife, but this forage allocation on critical winter ranges does not guarantee that spring-summer-fall livestock use will result in adequate forage being left for wintering elk, antelope, deer and moose. To insure that forage is available on big game critical winter ranges, measures should be taken to minimize livestock use at such sites. (Refer to Habitat Requirements and Habitat Maintenance Recommendations for Wildlife Species-Part 1.)

The checkerboard boundary fence proposed in Alternative 1 would impose an additional barrier to antelope movement in some winters. This fence would cause some direct mortality of big game from entanglement. However, adverse effect of alteration of antelope winter distribution in harsh winters would be more decimating than losses from entanglement (refer to Big Game Habitat Requirements-Part 1). The negative aspects of restriction of antelope movements by this fence can only be partially mitigated (refer to Antelope-Part 1 and Fencing-Part III).

ALTERNATIVE NO. 2

Livestock Removal

1. All livestock use would be removed
2. 572,668 AUM's would be available to wildlife
3. All existing fences would be removed
4. No new water developments would be implemented

This alternative would provide optimum benefits to wildlife by minimizing conflicts between livestock and wildlife. Impacts wrought by development of other resources and human pressure increases would still be limiting to wildlife carrying capacity. The amount of critical winter range would still limit numbers of wild herbivores. Maintenance of desirable successional stages of plant communities would still need to be planned. As succession and wild ungulate use of plant communities changes, so will the capacity to support browsers and grazers. Refer to Game and Fish Alternative No. 7.

ALTERNATIVE NO. 3

Allow Conversions Without Fencing

1. Conversion from sheep to cattle use would be granted
2. All non-use would be activated
3. Existing pastures would remain the same
4. Fencing would be employed only along the checkerboard boundary
5. No riparian habitat improvements would be made
6. Livestock use would be season-long, as it is now
7. Some water developments would be created (somewhat greater than current situation)
8. There would be three deferred pastures
9. There would be a severe grazing intensity on 15,000 acres-primarily riparian zones

The increased livestock use and conversions in this alternative would be the same as those in the proposed action. Comments about activated non-use based on a 1964-65 ocular reconnaissance survey of carrying capacity were made in the discussion of the Proposed Action. They are also applicable to Alternative No. 3.

Conversions from sheep to cattle were discussed in the Proposed Action and those comments are applicable here. Increased cattle use would decrease winter range forage for elk. Provisions should be made to minimize livestock use of winter ranges important to elk (refer to Elk-Part 1).

This alternative does not provide adequate water development for livestock and wildlife away from big game winter range. Comments about big game and livestock water development and livestock-wildlife distribution made in our discussion of the Proposed Action and Alternative No. 1 are also applicable to Alternative No. 3. Wildlife water and habitat requirements are discussed by species in Part 1.

This alternative has no provision for improvement of deteriorated aspen, riparian or wet meadow habitat important to wildlife.

Comments on fencing made in our discussion of Alternative No. 1 are applicable here since the degree of fencing is similar.

This grazing system would be similar to the current situation, which we discussed in the evaluation of Alternative No. 1. Increased cattle use would conflict more with elk and moose than with mule deer and antelope (refer to Habitat Requirements and Recommendations-Part 1). The three unfenced deferred pasture systems proposed would have an insignificant effect on wildlife. However, the lack of consideration for the

needs of wintering big game and the livestock use of important winter ranges will decrease available winter forage.

The verbal description of fencing in this alternative indicates that the only new fence proposed is the checkerboard fence. However, the map of developments for this alternative illustrates fences on all allotment boundaries. Either the map or the description on page 8-47 is incorrect.

ALTERNATIVE NO. 4

Livestock Operators Proposed Action

Significant Points of Consideration

1. Rearrangement of allotment boundaries
2. Interior allotment pastures would remain unfenced
3. Intensive water development
4. Less intensive grazing system than Proposed Action--mainly deferred grazing. More intensive grazing system than Alternative No. 3
5. Wildlife forage allocations vary because of allotment changes
6. Non-use would be activated and conversions allowed
7. There would be 323 miles of new fence under this proposal
8. Range improvements have not been located

Evaluation

This alternative would impose less fencing than the proposed action because only allotment boundaries would be fenced. Fences proposed in this alternative are not located where they would best accommodate wildlife movements and winter range use. The system was not designed to provide major wildlife habitat requirements.

The intensity of water development in this proposal is unacceptable because the location of water developments has not been given. Locations of water developments determine their acceptability. Some developments may promote summer livestock and/or wildlife use of critical winter range, as discussed in our evaluations of Alternative No. 1 and the Proposed Action.

Deferred grazing by cattle in spring and early summer would be beneficial to winter range important to sage grouse, mule deer and antelope. However, deferred grazing of elk winter ranges would cause increased livestock utilization of grasses and decrease the likelihood of adequate fall grass regrowth. All wildlife would benefit from decreased competition for spring forbs. However, without a provision for minimized livestock use of important winter range and riparian habitat, the positive affects of this system would be negated.

Full conversions and activated non-use would occur under this alternative. Comments

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relative to these elements have been made in the evaluations of Alternative 1 and the Proposed Action.

This degree of fencing is large-scale. However, it is less than the Proposed Action. Comments made about fencing associated with the proposed action and about Part 1 are applicable to Alternative No. 4.

ALTERNATIVE NO. 5

Reduction of Grazing Capacity on Allotments where Excessive Soil Erosion and Poor Livestock Range Condition Exists

Significant Points of Consideration

1. 74,613 AUM's of livestock use would be implemented (this is 18% less than present use) with short term non-use and long-term non-use activation after carrying capacity determinations. (Use areas will absorb reduced use)
2. Checkerboard fencing will be employed
3. Conversions would be allowed from sheep to cattle
4. Intensive grazing systems would be the same as the proposed action
5. Fencing and water developments would be the same as the proposed action
6. Wild horse and wildlife forage allocations would be the same as P.A. and alternatives

Evaluation

An 18% decrease in livestock use would allow more available forage for wildlife, including winter forage, so the winter range would be more likely to maintain wildlife numbers through harsh winters. Not activating non-use until new carrying capacity determinations are made would further ensure that some forage would be available for an unknown time. Prior to initiation of non-use, and after updated carrying capacity determinations, wildlife habitat requirements should be met and maintained as an integral objective in grazing system development (Big Game and Sage Grouse Habitat Requirements-Part 1).

Comments about the proposed grazing systems, fencing, water developments and proposed use conversions made about the Proposed Action apply here.

The allocation and reservation of forage on critical big game winter ranges is very important. Population maintenance hinges on forage availability on critical winter range. Forage availability can be drastically decreased if snow cover is coupled with intensive summer livestock use of vegetation, and carrying capacity of winter range can be reduced. Wyoming Game and Fish Department population objectives for mule deer, antelope, elk and moose are near optimum levels. These populations will be maintained at or near these levels through regulated harvest.

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ALTERNATIVE NO. 6

Site Specific Suggestions

Significant Points for Consideration

1. Boundaries and pastures and degree of fencing are the same as the Proposed Action
2. Development of livestock water would not occur on critical winter habitat
3. Intensive grazing systems in six pastures are designed to benefit riparian areas
4. Non-use would be activated
5. When 70-75% of current year's growth on key riparian forage is removed, livestock would be removed on 3 pastures of 3 allotments

Evaluation

The degree of fencing for Alternative 6 is the same as the Proposed Action and would be expected to have similar impacts on wildlife. The discussion of fencing in our comments on the Proposed Action apply to this alternative.

The development of additional water only on summer big game habitat and away from critical winter habitat benefits big game by allowing expanded use of arid, summer habitat while preserving forage on critical winter range.

The intensive grazing system described in this alternative complement shrubs in riparian areas by substituting Treatment E for Treatment A and thereby discouraging early use of shrubs when they are most affected by use. It is also desirable that no more than 70% use of riparian shrubs by livestock is allowed. A limitation to 70-75% use in six pastures in the Prospect Mountain Area will benefit wildlife (refer to Part IV-Wyoming Game and Fish Alternative No. 7 and Game and Fish Department recommendations for maintenance of required habitats for antelope, mule deer and moose-Part 1). These recommendations allude to guidelines for minimizing competition between livestock and wildlife for shrub cover and forage. On existing deteriorated riparian habitat it is unlikely that one or two years rest from livestock use, followed by one or two years heavy livestock use will be sufficient for shrub re-establishment.

Activation of non-use was addressed in our evaluation of the Proposed Action and Alternatives 1, 3, 4 and 5.

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PART III - RECOMMENDATIONS AND COMMENTS ON DESIGNS OF GRAZING SYSTEMS, FENCES, AND WATER DEVELOPMENTS

This section deals with the five general elements considered in the proposed action and the six alternatives. The following establishes basic wildlife-related factors to be considered when implementing grazing systems so that wildlife and wildlife habitat are not adversely affected.

1. Grazing Systems

   a. Grazing systems which maintain habitat components (food, cover, water, space) required by both game and nongame wildlife in the Sandy Area should be implemented.

      Any system implemented on the Sandy Area should provide the necessary habitat requirements for wildlife species.

   b. Prior to range improvement designed to accommodate livestock use, we recommend that our field personnel be consulted about the location and design of these improvements to best fulfill wildlife habitat requirements and minimize livestock-wildlife-feral horse conflicts. Developments posing problems for maintenance of wildlife habitat should be altered through compromise between BLM and this Department. (Refer to Water Developments, Fencing, etc. in following sections.)

   c. Range condition should be evaluated periodically (every three years). Without periodic condition and trend measurements the vegetation can change significantly enough to decrease carrying capacity. Continued grazing can further reduce this.

      Livestock grazing intensity should change as carrying capacity changes.

   d. Wildlife population objectives will be changed and numbers regulated through harvest if surveys of range condition and trend indicate carrying capacity changes.

   e. Livestock range improvement measures such as shrub control, water developments, fencing and intensive grazing systems, which are designed to decrease shrub cover, should not be implemented on important seasonal wildlife habitat. Close cooperation with our field personnel can avoid problems for wildlife due to range improvement.

   f. The current rest-rotation grazing system in the Burnt Fork-Thomas Fork Allotment in the Kemmerer Resource Area should be used to test the overall effect and effectiveness of this grazing system. Of particular importance are the cumulative effects on wildlife distribution, use, seasonal patterns and productivity as a result of fencing and changes in plant communities.

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2. Water Developments

The placement and design of water developments in any grazing system for livestock on public land should consider the need to maintain the quality and quantity of habitat for wildlife. We recommend the following considerations in livestock and wildlife water developments in the Sandy Area:

   a. Permanent water sources on arid, water-deficient ranges will improve the distribution and productivity of antelope, mule deer and elk if these developments do not allow animals to use winter range yearlong and thus overuse forage on the winter range. Some water developments may dry up nearby springs. Hydrologic studies should precede water development.

   b. Winter sheep use of antelope critical winter range is not desirable. However, moderate summer use by cattle is not detrimental to the carrying capacity of antelope winter range.

      1) Water for livestock or wildlife is not developed on critical antelope winter habitat. This will prevent concentrated summer-fall antelope use of shrubs important in winter.

      2) Livestock waters maintained on critical antelope winter range are shut-off from antelope use in spring or early summer, then cattle allowed on the range and waters turned on when the majority of antelope have vacated critical winter range.

      Prior to development of livestock and/or wildlife waters surveys should be conducted by field personnel of this Department and BLM to locate areas of least conflict and to identify potential problems.

   c. Water on big game summer range should be made available to wildlife during periods when livestock are off the range.

   d. Water developments should be fenced with a portion open to antelope. The fenced portion would provide untrampled vegetation as habitat for nongame species.

   e. Development of livestock water or range improvements which would decrease available forage or cover for elk, antelope, mule deer, moose or sage grouse on critical winter range or breeding and parturition habitat should not be undertaken (refer to Part 1).

3. Fencing

The following measures and recommendations should be considered prior to any fencing for livestock grazing.

   a. Fencing should be kept to a minimum. Existing highway fences, allotment fences (White Acorn-Gold Creek), irrigation project fences, individual use pasture fences, Palmer Draw exclosure fences, private land fences, and proposed riparian habitat exclosures (Alternative No. 7-Game and Fish

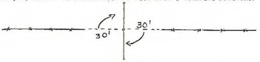
Alternative) are considered to be the maximum allowable without creating wildlife-livestock conflicts and causing detrimental impacts to wildlife.

b. Large scale fencing in the Proposed Action and Alternatives 4, 5, and 6, coupled with future mineral and oil development, increased recreational use, increased human population pressure, urbanization, water resource development, agricultural development and increased industrial development will complicate the dilemma facing wildlife and reduce range carrying capacities for major wildlife species.

c. Large-scale fencing employed in an intensive livestock grazing system should be accompanied by mitigation measures to accommodate wildlife habitat requirements:

1) Pasture boundary fences should be located to accommodate big game habitat needs--this should be a cooperative effort in the early stages of planning for livestock grazing systems requiring fencing. (Refer to Parts I and II).

2) Fences should be constructed with cattle guards on major dirt roads and with periodic gates. Fencelines should be surveyed weekly beginning immediately after the first fall snow, so that concentrations of wildlife along the fenceline can be located and the fence altered to accommodate movement. Logically, this should be done by the people who build the fence. Once a problem area is located, a permanent wing gate (see example) should be constructed to accommodate wildlife movement.



3) Four strand barbed-wire fences are less acceptable than three strand barbed-wire fences for accommodating antelope movements.

4) Consultation with Wyoming Game and Fish Department field personnel will indicate probable problem areas where specifications can be modified during the building of fences. Refer to comments by Dave Lockman dated July 1, 1976, to Neil Morck relative to Fencing in the Proposed Plan of Action.

5) While we support fencing of riparian areas, we feel that this is at best a stopgap measure. Grazing systems should be developed which do not deteriorate riparian habitat. However, fencing may be required in some riparian areas of the Sandy. In those areas fences should not border key raptor foraging habitat such as prairie dog towns or shorebird concentrations, since there is a good chance of raptor mortality due to the birds impacting fences. Fences should also not be so numerous that they interfere with waterfowl or shorebirds.

4. Activation of Non-Use

Our concerns about activation of livestock non-use have been stated in Part II-Evaluation of the Proposed Action and Applicable Alternatives.

a. We recommend that non-use remain on allotments containing critical wildlife winter range.

b. If non-use is activated, livestock use should be minimized through herding and water developments to prevent overuse of forage on key winter ranges.

c. If non-use is activated and riparian habitat is not protected, sheep use will be less detrimental to riparian habitat, critical winter range, and breeding and parturition habitat than cattle.

5. Livestock Class Conversions

Our concerns about livestock class conversions have been expressed in Part II-Evaluation of the Proposed Action and Applicable Alternatives.

<u>General Comments Concerning Impacts upon Nongame Species</u>

First, there was little consideration of impacts of grazing changes on nongame species, even though these species are becoming more important both statewide and nationally and far outnumber most game species. There are far too many species to analyze possible impacts by species. However, the following general comments, made from an ecosystem standpoint apply to this EIS.

1. A major objective of the management of nongame species is maintenance of maximum species diversity at levels that meet ecological and recreational demands, including the ability of each species to perpetuate itself.

2. The principal vegetation type in the Sandy Area is sagebrush-grass. That type will be severely reduced in acreage by rest-rotation grazing. Heaviest impacts will be suffered by species such as Brewer's sparrow, sage thrasher, and green-tailed towhee, which are totally dependent upon that vegetation type. There will also be severe impacts upon those species which partially depend upon the sage-grass type.

3. Riparian vegetation in xeric habitat like most of the Sandy Area produces the greatest density and diversity of wildlife species. Many species would not occur in the Sandy Area without riparian vegetation. There is already serious degradation of this habitat in the Sandy Area, and we believe the Proposed Action will accelerate that deterioration.

4. Diversity of nongame species is largely dependent upon topographic and vegetation structure. Livestock use of desert shrub areas tends to reduce structural diversity by trampling and browsing of shrubs and by intense grazing of grasses and forbs.

Habitat in the Sandy Area which is most sensitive to livestock use is riparian habitat, wet meadows, and aspen. Unless they are carefully managed, these habitat types suffer intense use followed by deterioration and invasion of dominant vegetation from adjacent habitat types.

5. The bald eagle, peregrine falcon, and black-footed ferret are all endangered species. The first two occur in this area, and the occurrence of the ferret has not been thoroughly investigated. Riparian habitat is important to the bald eagle and peregrine falcon, and any decline in quantity or quality of this habitat can be considered a significant impact upon these species. There is evidence that some bald eagles feed on carrion in winter. Decline in quantity of winter habitat for big game is likely to decrease the number of wintering animals and thus the potential food supply for bald eagles.

The white-tailed prairie dog is usually found in sagebrush vegetation types. Since these prairie dogs are considered primary prey for black-footed ferrets, we can surmise that impacts to prairie dogs from habitat destruction will also impact ferrets.

6. Riparian cottonwoods along the Green River are a unique habitat type for nongame birds. This vegetation type should not be allowed to deteriorate as a result of livestock use.

From the standpoint of nongame species, Alternative 3 is disastrous, Alternative 2 is excellent. The Proposed Action and Alternatives 1, 4, 5, 6 have some desirable aspects but would ultimately be detrimental to nongame species. Alternative No. 7 offers an approach for developing an acceptable livestock use system for the Sandy Area while maintaining wildlife numbers and diversity. We believe that this best fits the concept of multiple use.

Our recommendations for nongame species are generally the same as those for game species. Habitat is necessary for maintenance of both.

PART IV - SPECIFIC COMMENTS ON THE D.E.S. CONCERNING AQUATIC RESOURCES

Comments are in order of pagination of D.E.S.

P. 1-3, Paragraph 1: <u>Description of Proposal</u>

As stated, major purpose of the Proposed Action is to protect and enhance wildlife, habitat, watersheds, etc. This is desirable and efforts should be directed toward achieving this goal.

P. 1-19, <u>Grazing System Management</u>

Col. 2, Paragraph 3 states: "Any grazing system would be subject to modification if it becomes apparent that environmental deterioration would occur if the system is followed as proposed." This should be kept in mind through monitoring after a grazing plan is adopted.

P. 1-21, <u>No Grazing</u>

Streams and streambanks should be considered under this designation.

P. 1-30, <u>Fences</u>

The proposed types of fences are stated to be a response for mitigating major impacts of fences on wildlife movements. Properly constructed fences can also be used to prevent or curtail livestock damage to aquatic ecosystems.

P. 1-36. A Draft Aquatic HMP was prepared. Aquatic information and recreation were said to have been considered in preparing AMP's. The DES should more clearly state how these were considered and what features from the Draft Aquatic HMP were incorporated into the AMP.

P. 3-16, <u>Water Quality</u>

Paragraph 4. Channel stability is proposed to increase by 1% in the Sandy area. This appears to contradict paragraphs 5 and 6 which indicate that channel stability would decrease due to increased livestock grazing intensity along stream channels. This is not acceptable. Provisions must be included to maintain or improve upon existing channel stability. It is important to keep in mind that, although many streams have already been damaged to varying extents, causing further stream deterioration is not responsible land management.

P. 3-80 to 3-91 - <u>Impacts of the Proposal - Aquatic</u>

This section is replete with descriptions of stream habitat damage from the proposed actions. The DES (p. 3-80) states that ". . . it is doubtful whether the systems proposed fully consider or are sensitive to the requirements of aquatic management objectives . . . ." Most of the stream habitat would fall under the proposed alternately grazed system or a three-pasture rest-rotation system. The former is described to produce the following changes in stream habitat:

1. Reduced fish holding and rearing capacities.

2. Increased summer temperatures and lower dissolved oxygen levels.

3. Reduced energy budgets and productivity of food organisms.

4. Accelerated rates and degrees of streambank erosion - as much as 1362%.

Measures must be employed to prevent these damages from occurring and (where possible) improve over the existing condition.

P. 3-88 (Figure 3-9) provides a good visual example of stream conditions relative to cattle grazing. The entire aquatic impacts summarization on page 3-84 indicates that "The general aquatic habitat trend within the Sandy Area would continue to be downward as a result of the proposed action." The proposed action is not compatible with proper aquatic habitat management.

P. 4-1, Mitigation Measures

The mitigating measure suggested for aquatic habitat is good as far as it goes; however, fencing 26 of 138 total stream miles still leaves problems. Poor practices upstream from the enclosures or on unenclosed areas could negate improvement attempts. Although difficult to visualize from information in the DEIS, offsite degradation would still appear to be a problem. In short, additional consideration is needed for aquatic/riparian habitat.

P. 4-10, Analysis of Effectiveness of Mitigating Measures

The effectiveness of mitigating measures was analyzed for the 26 stream miles, but the overall effect from both mitigated and unmitigated portions is not adequately displayed.

P. 3-3, Renewable Impacts, Aquatic

The overall resulting condition is still unclear. Much depends on locations and management practices upstream from the enclosures. Additional consideration should be given aquatic/riparian habitat. Inadequate consideration is given to off-site impacts.

The relationship between the grazing plan and the State 208 water quality management plans for nonpoint source pollution is not addressed. Best management practices should be incorporated to meet state water quality standards.

PART V - ALTERNATIVE NO. 7
WYOMING GAME AND FISH DEPARTMENT ALTERNATIVE

This alternative is based on the habitat requirements of game and nongame wildlife species inhabiting the Sandy Area, the need for maintenance of habitat diversity for all wildlife, and on our evaluation of the Proposed Action and Alternatives 1-6.

The following elements comprise this alternative:

1. Season-long livestock use will continue on all allotments at current levels until future studies indicate that the system is not sufficient for multiple use objectives. Then the change in management will be accomplished allotment by allotment after testing each grazing system.

2. There will be no more conversions than those already temporarily allowed.

3. No non-use activation will be allowed immediately. Non-use activations will be allowed after wildlife considerations have been designed into the livestock grazing system and updated carrying capacity determinations are made.

4. Cooperatively-designed surveys of range condition and vegetation production-utilization will be conducted. These data will be used to establish carrying capacities for wildlife and livestock.

5. Wildlife and free-roaming horses will be allocated seasonal forage sufficient to meet population objectives for each species. To ensure that forage and cover is available on big game critical winter ranges, livestock use of critical winter range will be set at a level cooperatively determined by the BLM and WGFD.

6. Fencing will be limited to existing fences, study exclosures, riparian areas and water developments. Water developments will be fenced to partially or totally exclude livestock and/or wildlife species, as circumstances dictate.

Fencing to improve and study riparian habitat will be accomplished after coordination with the Wyoming Game and Fish Department.

Trends in riparian/aquatic habitat quality will be monitored.

7. Livestock or wildlife water will not be developed on critical big game winter range. An optimum density of livestock and wildlife water sources will be developed on big game summer range (as discussed in antelope, mule deer and elk habitat requirements-Part I). This will be accomplished cooperatively (BLM and WGFD).

Water developed for livestock will be left running and made available to wildlife on summer big game range in periods when livestock are not occupying the range.

8. The rest-rotation grazing system now in use in the Burnt Fork-Thomas Fork allotment in the Kemmerer Resource Area will be used for testing the overall effects and effectiveness of this grazing system.

9. Terrestrial and aquatic habitat improvements in deteriorated wildlife habitat will be cooperatively planned. These projects will be funded by BLM and/or cooperatively obtained Sikes Act funds.

10. Wildlife habitat diversity and density specified in Part I for antelope, elk, sage grouse, mule deer and moose will be established as minimal range vegetation maintenance objectives in livestock grazing systems. This will ensure maintenance of habitat sufficient to meet population objectives for wildlife and maintain species diversity in the Sandy Area.

11. Management measures will be implemented to decrease erosion on sites where potential for erosion reduction exists. The WGFD will be consulted about potential effects on terrestrial and aquatic wildlife.

SUMMARY

Alternative No. 2 is the most desirable alternative for wildlife. However federal lands are managed for multiple use, not just for wildlife. Multiple use should not allow benefits to accrue to one user at the expense of others. There are aspects which are desirable in the Proposed Action and in each alternative, but they are invariably in conjunction with less desirable or undesirable aspects. Alternative No. 7 meets the multiple-use concept yet does not adversely impact wildlife.

The following quotation from William R. Moore seems to fit our general feeling about this EIS and the need for consideration of multiple use:

> Knowledgeable professionals must work with natural systems in an integrated way. To ignore them or manipulate them with only rudimentary understanding is a most unprofessional act. And there is far too much of that already going on.

31d

I
Appendix MAN
GUIDELINES FOR MAPPING WILDLIFE DISTRIBUTION

Type	Description	Symbol
Summer	The general geographic area occupied by a migratory herd during summer months. (Approximately June 1 - October 31)	_____ S
Winter	The general geographic area occupied by a migratory herd during winter months. (Approximately November 1 - May 31)	_____ W
Migration Routes	Definable route followed during seasonal movements year after year.	Mr
	a. General area of movement	→?←
	b. Specific movement corridors	→ → →
Parturition Areas	Geographic area consistently used for birth of young.	------ P
Breeding Areas	Geographic area consistently used for breeding by the majority of a population.	---.-. B
Display Areas	Sites consistently used by the male segment of game bird populations during courtship, e.g., strutting grounds, dancing grounds, drumming sites, etc.	
	a. censused	⊕
	b. uncounted	⊖
	c. abandoned	X

31d

Type	Description	Symbol
Yearlong	Geographic area occupied by all or a portion of the population for the entire year.	_____ Y
Combination	Range where animals occur during more than one season.	_____ S/Y _____ W/Y
Critical	That range that is present in minimum amounts and is the determining factor in the potential for population maintenance and/or growth. This will usually be represented by a winter concentration where most members of a population are forced during periods of maximum snow cover each year or where most members of a population are concentrated during periodic severe winters. The critical range may also be represented by late fall water source or other resources in short supply, e.g., cover for breeding, nesting, fawning, etc. The degree of criticalness is related to a specific herd and is not related to the density of animals relative to any other herd.	(////)

31e

National Natural Landmarks:

This is an existing designation which has reposed in the National Park Service of the Department of the Interior for years. It recently has been transferred to the Heritage Conservation and Recreation Service by action of President Carter. At no place in the draft Statement is there consideration of this type of value. The Killpecker Sand Dunes are eligible for Landmark status and have been given the top priority rating of 1A by two studies conducted for National Park Service. Boars Tusk is a part of the Luecite Hills which have been given a priority rating of 1C. Similarly, Steamboat Mountain has been given a rating of 1B and 1C by the studies while Oregon Buttes-Continental Peak was given a 1C rating. These areas should be afforded some consideration and protection in this Statement. Specifically, fencing the checkerboard boundary would damage these areas by visual impact and the impacts of construction and livestock and vehicular traffic paralleling these fences. The proposed boundary fence would cross the Killpecker Dunes twice and would go right across the top of Steamboat Mountain.

Water:

Water developments in these areas need to be carefully considered for their impacts on the natural qualities and in some cases may need to be eliminated or placed elsewhere.

Visual Impacts:

The Great Divide Basin is a geological phenomenon occuring no where else along the Continental Divide and probably no where else within the Western Hemisphere. As such, it deserves special consideration. All portions of the Sandy Grazing District that lie within the basin should be designated as Class II land where developments would be disguised to the greatest degree possible. This is especially true of those areas visible from the Point of Rocks-South Pass Road which is a focal point and route for visitors to the area. Its relatively untouched condition of no fences or paved roads for nearly 60 of its approximately 70 mile length make it one of the most unique of our historic roads within Wyoming, even though its historic significance is not as great as that of trails like the Oregon and Mormon. Additional fence crossings of this road should be avoided and eliminated if at all possible.

Fencing:

The checkerboard boundary fence is damaging to the wilderness character of the basin area.

31e

Appendix VI

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Wyoming Recreation Commission

604 EAST 25TH STREET CHEYENNE, WYOMING 82002

JAN L. WILSON
Director
777-7695

June 29, 1978

Re: 78-109-D
Sandy Grazing Environmental
Impact Statement (Draft)

Mr. Richard Hartman
Wyoming State Planning and
Coordinator's Office
2320 Capitol Avenue
Cheyenne, Wyoming 82002

Dear Mr. Hartman:

Reference is to 78-109-D, Sandy Grazing Environmental Statement, U. S. Department of the Interior, Bureau of Land Management. We appreciate the opportunity to comment on this draft Statement and have, in this letter, done so by categories.

Archeological:

The designated archeological potential has left out known archeological values at such sites as Steamboat Mountain, Freighter Gap, Point of Rocks-South Pass Road and the Pacific Springs-South Pass-Burnt Ranch areas.

Historic:

No mention is made of the Chicken Springs Stage Station. The "Mormon Mail Station" is also Burnt Ranch; South Pass Station for the first Overland Stage Route, the Pony Express and the first transcontinental telegraph; and the Last or 9th Crossing of the Sweetwater for the Oregon-Mormon-California Trails. It was also the site of a stage station for the Point of Rocks-South Pass Road.

Trail:

No mention is made of trail condition for any trail but the Oregon. The ruts there are described in various stages of condition. Much of those ruts were a part of the original Lander-Rock Springs Road and received much wagon and automobile traffic between those two points. Many of the ruts were undoubtedly caused by Model T's and A's and similar vehicles. Probably the most pristine trail in the Sandy Grazing District is the Point of Rocks-South Pass Road which has visible original ruts for over 50 of its 70-mile length.

31e

Recommended Changes to the Proposal:

The Red Desert, Bush Rim, Steamboat Mountain and Continental Peak areas should be combined with little or no fencing. They should also be studied as a Primitive Area for those portions lying within the Great Divide Basin as is suggested in the proposal for the Red Desert area alone.

No checkerboard boundary fencing should be done in Ranges 101 and 102 West.

In all construction carried out under any of the proposals outlined within the Statement, close attention should be paid to any ground disturbance for the appearance of paleontological, archeological or historic artifacts in which case construction should immediately be halted and the State Historic Preservation Officer should be contacted at once. No further construction should be done until clearance is recommended by that Officer.

Sincerely,

Jan L. Wilson

Jan L. Wilson, Director and
Wyoming State
Historic Preservation Officer

JLW/mlr

cc: Dr. George Frison
Wyoming State Archeologist

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

State Engineer's Office

BARRETT BUILDING CHEYENNE, WYOMING 82002

WYOMING WATER PLANNING PROGRAM

June 27, 1978

Mr. Dean F. Foregren
Bureau of Land Management
Sandy ES Team Leader
P. O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Foragren:

I have the following comments from my review of the Draft Environmental Statement on the Proposed Domestic Livestock Grazing Management Program for the Sandy Area. My comments deal primarily with the water-related aspects of the statement.

1. Page 1-8, first column, and page 1-40, Wyoming State Engineer: The recognition of the need to file applications for all water developments with the Wyoming State Engineer is noted.

2. Page 2-15, Water Use: The evaporation quantities need to be checked. If the average evaporation per reservoir is based on Appendix 2E, it is in error (see my comment no. 20). The 299 existing reservoirs (page 2-15) multiplied by the erroneous average evaporation figures from Appendix 2E does not result in the 232 ac-ft/yr given on page 2-15. If the 232 ac-ft/yr figure is not based on Appendix 2E, how was it determined?

Perhaps there should be some mention of the irrigation water use on the Eden Project, and on private lands upstream of the Sandy Area. There apparently are interactions between the Eden Project irrigation and some of the springs and wells in the Sandy Area. There may also be water rights conflicts. These aspects are probably more pertinent to the discussion than the downstream Green River use and the waste water discharges to the Green River above the Sandy Area.

3. Pages 2-15 and 2-27, Water Quality: On page 2-15, the implication is that the Green River salinity goes from less than 750 mg/l to over 2700 mg/l after the Big Sandy River enters it. Table 2-9 (page 2-26) which is referred to in this context does not indicate this, as it gives data for only one Green River station and three stations in the Big Sandy drainage. No Green River salinity data is shown below the Big Sandy River confluence. This needs to be clarified.

Mr. Dean F. Foragren
Page 2
June 27, 1978

On page 2-27, the reference to Table 2-10 indicates that it summarizes existing standards of certain parameters. Table 2-10 (page 2-28) carries footnote 1 that states that the "standards" are those ". . . recommended by the Southwestern Wyoming Water Quality Planning Association." In the Association's Technical Report (Clean Water Report for Southwestern Wyoming, September, 1977, prepared by Clyde Hill, Inc.), I am unable to find the so-called recommended standards, and the numbers do not even match all the criteria given in the report. Since the source is not adequately referenced, I wonder if the SWQPA Technical Report was used, or if Table 2-10 was compiled from preliminary material. The proper source for existing water quality standards is the Water Quality Division of the Wyoming Department of Environmental Quality.

4. Page 2-150, Water Use: The Colorado River Compact of 1922 does not "appropriate" water to Wyoming, or to any other state. It divides the water of the river between the Upper and Lower basins. The Upper Colorado River Basin Compact of 1948 apportions the Upper Basin's share among the several states, including Wyoming. The appropriation of the water is accomplished by individual entities in each state under the laws of that state.

5. Page 2-152, Table 2-73: The table apparently tries to cover the Green River drainage above Green River, Wyoming. If so, it is incomplete and what is there is not completely accurate. The applications for all Wyoming reservoirs and diversions must be filed with the Wyoming State Engineer, and his office is the proper source for such data.

6. Page 2-158, second paragraph, first column: I have not heard of a "Little Colorado Compact". The "Upper Colorado River Basin Compact" was probably intended. The conclusion in the same sentence, ". . . could lead to the establishment of a fair to marginal warm water fishery in place of the trout fishery existing today", is probably unwarranted except for some localized areas.

Wyoming is entitled to a total depletion from the Colorado River system that is estimated to be between 800,000 and 1,043,000 acre-feet per year. Much of the remaining future depletion is expected to be from the Green River proper, with certain consumptive reservations on locations of diversions in order to protect the fishery below Fontenelle Dam. Some of the depletion would be from Blacks Fork, Henrys Fork, and Little Snake River drainages.

I also have reservations about the statement in the first paragraph on this same page, especially when it is used as a blanket conclusion. Upstream water rights that are junior in time to downstream rights may not divert water unless there is sufficient flow to satisfy senior downstream rights. The exception is when there is so little water in the stream that it would not flow down to the senior right if the upstream diversion were not made. The streams at present do serve as "natural canals" to transport water - as they always have. (See also my comment no. 26).

Mr. Dean F. Foragren
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7. Page 3-8, Water Use: ". . . an increase of 44 acre-feet and 79 acre-feet . . . above existing livestock water use levels (Table 3-6)." A little arithmetic on the totals in Table 3-6 indicates that the corresponding increases would be 37 and 73 ac-ft. The discrepancy is negligible compared to total uses, but the numbers should be consistent.

The evaporation figures in the last paragraph under this heading and in Table 3-7 (page 3-11) should be checked and corrected as necessary. See my comments 2 and 20 for further discussion on this.

8. Page 3-12, second paragraph, first column: "Several new projects are being proposed at this time, . . ." When is "this time"? I would much prefer to see this reworded to read: "Several new projects have been proposed, . . ." There are no new major or intermediate diversions to eastern Wyoming that are being actively pursued at this time (June 1978). There is a possible development being considered for total consumption from the lower Big Sandy River. If this would be developed, stock water could be provided. It is not likely that any other probable major development would have much effect on, or be much affected by, the Sandy Area grazing actions. Localized areas might affect, or be affected by, particular parts of the developments proposed in the ES.

9. Page 3-12, Water Quality: "Sediment yield over the long-term would decrease in all alternates except the Sands Allotment, . . ." Table 3-10, page 3-15, indicates an increase in sediment yield in the Farson Use Area of the Little Colorado Allotment.

"Sediment yield would increase downstream from the proposed reservoirs due to headcutting if the sediment is not removed from them . . .". How would removal of sediment from the reservoirs affect headcutting downstream of the reservoirs?

At the end of page 3-12 and the start of page 3-16 there is some discussion about headcutting as a result of reservoir construction. Could this be eliminated, or at least reduced, in most cases by combinations of spillway lining and energy dissipators? There should be an ample supply of native rock in the vicinity of most reservoir sites. I should think this would be cost effective considering the cost of repair or replacement of a reservoir breached by headcutting, the environmental costs of having the sediment dumped into a channel from a breached reservoir, the costs from loss of a "watering hole" until the reservoir was repaired or replaced and refilled, and the costs of salinity increases expected from headcutting.

10. Page 3-16, Summary of Impacts: The reservoir evaporation needs to be checked and corrected. See my comments 2 and 20 for further discussion.

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Page 4
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11. Page 3-122, Table 3-65: Under the Water Resource entry, the sediment yield is shown as being reduced, with the amount of change estimated at 284,363. Shouldn't this number carry a negative sign? What are the units for the sediment yield? Shouldn't the change in evaporation be included? Under the Aquatic Wildlife Resource entry for game fish, the change of 600-850 fish per mile should also be negative.

12. Page 6-1, Water Resources: The amount of the increase in evaporation losses due to water developments needs to be checked and corrected. See my comments no. 2 and 20.

The indicated increase of surface storage of water of 319 ac-ft is not consistent with the data in Chapter I (page 1-30) or in Appendix 2E. The storage in 63 reservoirs of 8.33 ac-ft average per reservoir plus 33 pits of 3.42 ac-ft average per pit would be about 638 ac-ft total new storage.

13. Page 7-1, Water Resources: The evaporation loss from the proposed pits and reservoirs is too low. See my comments 2 and 20.

14. Page 8-31, Water Use: The existing level of evaporation loss of 252 ac-ft/yr is apparently in error. See my comments 2 and 20.

15. Page 8-43, Water Use: The increased loss to evaporation is in error, and Table 8-38, page 8-57, is in error. See my comments 2 and 20.

16. Page 8-62, Water Developments: "Proposed water developments would be the same as the proposed action . . .". This statement is in conflict with page 8-47, where it states that two reservoirs would not be built, page 8-53 where it refers to 94 proposed reservoirs and pits, Table 8-38 which lists 61 reservoirs, and page 8-58 where 61 reservoirs are again mentioned. Under the Wildlife heading for Alternative 3, there is also mention of 141 new water developments under each animal category. These are referred back to Table 1-13, which includes the two reservoirs supposedly dropped for this alternative.

17. Page 8-86, Water Use: The increased water loss due to evaporation from pits and reservoirs is in error, and Table 8-58, page 8-88, is also in error. See my comments 2 and 20.

18. Page 8-99, Wildlife: Under Water in the various animal categories there are 86 new water developments mentioned for alternative 4. Table 8-53 on page 8-81 lists a total of only 81 new water developments for this alternative.

19. Page 8-115, Water Use: The evaporation loss figures here and in Table 8-73 on page 8-119 are in error. See my comments 2 and 20.

Mr. Dean F. Forsgren
Page 5
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20. Page A-25, Appendix 2E: If the reference cited in Appendix 2E, Smith (1974), was the basis for these calculations, it was not followed completely and there are also some analysis errors. In the following discussion I use the symbols as defined in Appendix 2E. The equations given by Smith are readily verified from texts and handbooks, or by derivation.

Under the Reservoir Evaporation Per Year heading, the assumption of average capacity, or volume when full, of 8.33 ac-ft, an average surface area when full of 2.5 ac, and an average depth when full of 10 ft is consistent with Chapter 1, page 1-30. The side slopes are irrelevant for a given pyramid configuration when comparing volume or base areas at different levels. Assuming 3.33 ft of evaporation per year, the depth after a year's evaporative loss would be 6.67 ft as shown in Appendix 2E. The calculated area of 2.39 ac after evaporation is incorrect, and should be 1.11 ac. However, this is not needed if the calculation form as given by Smith is used for the volume after evaporation, or

$$V_E = (H_E/H)^3 V = 2.47 \text{ ac-ft.}$$

(A set of calculations to support my results is attached to these comments).

For the evaporation per year from each of the reservoirs, 8.33 - 2.47 = 5.86 ac-ft/yr. This is almost twice the amount shown in Appendix 2E.

Under the Pit Evaporation Per Year heading, all results are in error. To be consistent with Chapter 1, page 1-30, I assume the intended parameters are a pit-full volume of 3.42 ac-ft at a depth of 12 ft when full. The side slopes of 4:1 for two sides and 3:1 for two sides as noted in Appendix 2E are necessary to the problem. I assume that sides with equal slopes are opposite each other; otherwise the bottom and midsection areas would be squares rather than the rectangles indicated in the calculations of Appendix 2E.

With the above information, the formula for the volume of a prismoid can be solved for the length of the sides of the square top (pit-full condition).

See the attached calculation sheets for the details, from which the top surface is 151 ft x 151 ft, or A = .523 ac. It follows that the bottom area is A_b = .100 ac, and the midsection area with the pit full is A_M = .272 ac. (This midsection area is not needed, except for use in a check solution to verify the calculated dimensions at the top surface).

Again assuming the annual evaporation as 3.33 ft, the depth after evaporation loss is 8.67 ft. The new surface area is A = .374 ac. The new midsection area is located 7.66 ft below the pit-full surface, and becomes A_M = .216 ac. The bottom area does not change. Solving for the volume after

Mr. Dean F. Forsgren
Page 6
June 27, 1978

the annual evaporation loss, V_E = 1.93 ac-ft. The amount lost to annual evaporation is then 1.49 ac-ft/yr.

The "Existing evaporation rate by reservoirs. . ." (page A-25) is not clear in this context. I presume the intent was an average annual evaporation volume per storage facility. If so, a simple arithmetic mean is misleading. There are about twice as many reservoirs as pits in the proposed action, 63 and 33, respectively, noted in Chapter 1 on page 1-30. Some of the alternatives indicate variations from these numbers. The above calculations are estimates of average annual evaporation for reservoirs and for pits. The actual number of each type planned for a particular scheme should be multiplied by the appropriate estimated unit evaporative loss, and then the two amounts combined for the estimate of total evaporative loss for the plan. If an average value for combined unit evaporative loss must be used, it should be a weighted average, or 4.36 ac-ft/yr for the proposed action.

The evaporation amounts used in various places in the Sandy Grazing ES should be corrected. I have noted many of these places in previous comments, but some may have been overlooked.

One point has been ignored in the evaporation treatment. In most years, the reservoirs and pits would be expected to fill, or partially fill, more than once. Thus, the water level would remain higher, a greater surface area would be exposed for evaporation, and the total evaporation would be greater than that indicated by the calculations. This would, admittedly, be difficult to quantify, and might be at least partially offset by failure to fill even once in some years.

21. Page A-53, Appendix 3A, Manning's Equation to Determine Velocity: Manning's equation is printed in such a way that the powers of R and S appear to be in the denominator with n. They should be in the numerator along with the 1.49 constant.

22. Page A-53, Appendix 3B: There seems to be some confusion here. There are 4 equations given, 2 for CI_E and 2 for CI_F. Is one pair of these repeated, and if so, should the CI_E equation have the constant term (58.09) as a negative or a positive number?

Comparing these 4 equations with the first equation in this appendix, and observing the definitions for the variables, it appears that the variables have merely been interchanged without the proper mathematical treatment. This needs to be either corrected or provided with an adequate explanation.

23. Page A-57, Column 16: Under A x B = C, the numbers and the definitions are not consistent. Should this be A ÷ B = C?

24. With respect to the pits and reservoirs, what action is planned when they fill with sediment to the extent that their usefulness is lost?

Mr. Dean F. Forsgren
Page 7
June 27, 1978

25. I do not necessarily disagree with the 10-year storm event as a basis for design for the reservoir facilities as discussed in the ES. However, in view of the concerns with headcutting and the sediment production resulting from failure that are expressed throughout the ES, I wonder if a larger event might not be advisable for design.

26. The authors of the statement should recognize that "first in time is first in right" is the basis of the prior appropriation doctrine around which Wyoming water law is structured. Any interference by one of the proposed water developments with a downstream development having a prior right could cause the new development to be required to bypass water to satisfy the prior right. Likewise, an upstream development with a prior right could deprive the downstream junior right of water until the upstream prior right was satisfied. Under conditions requiring strict regulation of water rights, it is possible that downstream prior rights could call water from the proposed developments. The proposed storage developments apparently have no provisions for bypassing water under these circumstances. These bypass provisions might, or might not, be required by the State Engineer, depending upon the location and circumstances of each development.

Thank you for the opportunity to examine this environmental statement, and to submit these comments.

Sincerely,

Louis E. Allen

Louis E. Allen
Water Resources Engineer
Wyoming Water Planning Program

LEA:ew

cc: George L. Christopulos w/attachment
William Long w/attachment
Steve Freudenthal

Calculations - Sandy Grazing ES 6-21-78 LEA 1/4

Support for figures used in the comment on page A-25, Appendix 2E.

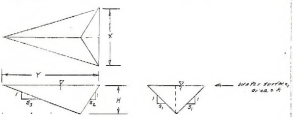
1. Derivation to show validity of $V = (H/H_f)^3 V_f$, as given by Smith (1974, page 7) and cited in Appendix 2E and elsewhere in the ES. Using Smith's notation:

$V = \frac{1}{3}AH$, volume of pyramid with base area A and altitude H, measured from the bottom.

$A = \frac{1}{2}XY$, area of triangle with side X and altitude Y (the top surface of the pyramid that approximates the reservoir).

Parameters for the full reservoir carry the "f" subscript. No subscript is used for the other volume considered.

Assume side slopes s_1, s_2, and bottom slope s_3 as shown:



$$\frac{V}{V_f} = \frac{\frac{1}{3}AH}{\frac{1}{3}A_f H_f} = \frac{AH}{A_f H_f} = \frac{\frac{1}{2}XYH}{\frac{1}{2}X_f Y_f H_f} = \frac{XYH}{X_f Y_f H_f}$$

Write X, X_f, Y, and Y_f in terms of altitude, H, and slopes:

$X = 2s_1 H$ and $X_f = 2s_1 H_f$

$Y = (s_2 + s_3)H$ and $Y_f = (s_2 + s_3)H_f$

$$\frac{V}{V_f} = \frac{(2s_1 H)(s_2 + s_3)(H)(H)}{(2s_1 H_f)(s_2 + s_3)(H_f)(H_f)} = \frac{H^3}{H_f^3}, \text{ or } V = \left(\frac{H}{H_f}\right)^3 V_f$$

In the appendix 2E notation, $V_E = \left(\frac{H_E}{H}\right)^3 V$.

Note that this expression is independent of the side slopes, whatever they may be.

2. Reservoir Evaporation per year, using the data given in Ch. 1, p. 1-30, and app. B2 for the full reservoir:

$V = \frac{1}{3}AH = 8.33$ ac-ft
$A = 2.5$ ac
$H = 10$ ft

After removal of 3.33 ft of water by evaporation,

$H = 10 - 3.33 = 6.67$ ft

$V_2 = \left(\frac{H}{H}\right)^3 V = \left(\frac{6.67}{10}\right)^3 (8.33) = 2.47$ ac-ft, the volume remaining in the reservoir after the annual evaporative loss.

The estimated amount of evaporation per year is:

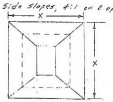
$8.33 - 2.47 = \underline{5.86 \text{ ac-ft/yr}}$ for the average res.

3. Pit evaporation per year, using the data given in Ch. 1, p. 1-30, and the valid data from app. B2 for the full pit, and dimensions derived as on the sketch:

$V = \frac{H}{3}(A + A_2 + A_M) = 3.10$ ac-ft

$H = 12$ ft, measure from pit-full surface downward.

Side slopes, 4:1 on 2 opposite sides of 3:1 on 2 opposite sides.



A square top surface is assumed when the pit is full, with sides of length X

Determine X:

$A = [X - 2(4)(4)][X - 2(4)(4)]$, or $A = X^2 - 64X + 1024$
$A_B = [X - 2(4)(12)][X - 2(3)(12)] = (X - 96)(X - 72)$
$A_M = [X - 2(4)(6)][X - 2(3)(6)] = (X - 48)(X - 36)$
$V = \frac{H}{6}(A + A_B + 4A_M)$ (for pit-full condition)

$3.10\,(43,560) = \frac{12}{6}\left[X^2 + (X-96)(X-72) + 4(X-48)(X-36)\right]$

for volume in ft³ and areas in ft².

Simplify:

$148,986 = 2(6X^2 - 504X + 13,824)$

$= 2(3)(X^2 - 84X + 2304)$

$12,416.6 = X^2 - 84X + 2304$

$0 = X^2 - 84X - 10,112.6$

Using the quadratic formula to solve for X, and considering only the positive root:

$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2A} = \frac{84 + \sqrt{(84)^2 - 4(-10,112.6)}}{2}$.

Simplifying:

$X = \frac{84 + \sqrt{47,481.6}}{2} = \frac{84 \pm 217.9}{2}$

$X = 150.97$ ft, or $\underline{151}$ ft

The Top surface with the pit full is 151 ft x 151 ft.

The surface area with the pit full is:

$A = (151)^2 = 22,801$ ft², or $\underline{.523}$ ac

The midsection area with the pit full is (at $\frac{H}{2} = 6$ ft):

$A_M = [151 - 2(4)(6)][151 - 2(3)(6)]$

$= 103$ ft x 115 ft $= 11,845$ ft², or $\underline{.272}$ ac

The bottom area, which remains constant for any water depth, is (it is 41 ft):

$A_B = [151 - 2(4)(12)][151 - 2(3)(12)]$

$= 55$ ft x 79 ft $= 4345$ ft², or $\underline{.100}$ ac.

— As a check, solve for the volume using the areas calculated above:

$V = \frac{12}{6}\left[.523 + .100 + 4(.272)\right] = 2(1.011) = \underline{3.42 \text{ ac-ft}}$,

the volume specified.

After 3.33 ft of evaporative loss, the surface area and the midsection area must be recalculated:

The new surface is now 3.33 ft below the pit-full surface (at 3.33'):

$A = [151 - 2(4)(3.33)][151 - 2(3)(3.33)]$

$= 126.34$ ft x 126.02 ft $= 15,923.15$ ft², or $\underline{.374}$ ac

The new midsection is now $\left(\frac{12 - 3.33}{2} + 3.33\right) = 8''$, or 7.67', below the pit-full surface:

$A_M = [151 - 2(4)(7.67)][151 - 2(3)(7.67)]$

$= 89.72$ ft x 135.04 ft $= 12,114.49$ ft², or $\underline{.278}$ ac

The bottom area is the same as before, $\underline{.100}$ ac.

The volume remaining after the yearly evaporation is removed would be $(H = 12 - 3.33 = 8.67$ ft):

$V_2 = \frac{8.67}{6}\left[.374 + .100 + 4(.278)\right]$

$= 1.445\,(1.338) = \underline{1.93 \text{ ac-ft}}$

The estimated amount of evaporation per year is:

$3.42 - 1.93 = \underline{1.49 \text{ ac-ft}}$/yr. for the average pit.

Appendix VIII

July 3 & 12/78

THE STATE OF WYOMING

Commissioner of Public Lands and Farm Loans

STATE CAPITOL BUILDING CHEYENNE, WYOMING 82002

PLEASE ADDRESS REPLY TO THE COMMISSIONER

June 23, 1978

Mr. Dean F. Forsgren, Team Leader
Sandy Environmental Statement
Bureau of Land Management
P. O. Box 1869
Rock Springs, WY 82901

Dear Mr. Forsgren:

This letter is in reference to the Sandy Grazing Environmental Statement Draft.

On 11/3/76 comments were made on the preliminary draft and a copy of our letter is attached for your reference. The futility of commenting is in evidence when our requests, as they specifically pertained to lands owned by the State, were not placed in the present draft as we requested. Items one and two merely had to be copied from our letter, but such was not done by the Bureau of Land Management.

It is essential that our phrasing in comment one of our attached letter replace the present wording under Wyoming Board of Land Commissioners on page 1-40 of the draft. The last sentence in the present draft wording is acceptable, but no reference, as stated by the BLM, is found in the Draft Glossary on page G-1 through G-11.

Our comment two on the attached must replace the wording on page 2-142 of the draft under Wyoming State Board of Land Commissioners.

If our originally requested changes had been made by the BLM it would not have been necessary to duplicate time and expense to comment in a second letter today.

Yours very truly,

A. L. King
Commissioner of Public Lands

BEL:ml

Attachment (1)

cc: Dan Baker, State Director, BLM

THE STATE OF WYOMING

Commissioner of Public Lands and Farm Loans

STATE CAPITOL BUILDING CHEYENNE, WYOMING 82002

November 3, 1978

PLEASE ADDRESS REPLY TO THE COMMISSIONER

Mr. Neil F. Morck, District Manager
Bureau of Land Management
P.O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Morck:

The following comments are offered reference the Sandy Preliminary Draft Environmental Statement:

1. The section relating to the Wyoming State Board of Land Commissioners on page 1-55 is not correct. Please delete the entire section and replace it with this wording, so that it is in conformance with our policy:

   The Wyoming Board of Land Commissioners is responsible for the administration of 87,185 acres of granted State land in the Sandy Area. They lease the lands for grazing to livestock operators for a ten (10) year term. The lessee is considered the guardian of the lands, which are not open for public access unless an easement is approved by the Wyoming State Land Board and recorded in the office of the Commissioner of Public Lands. Free use of State land is not permitted and vehicular traffic is prohibited unless on a public access road. A lease of State land provides the lessee the right to make any improvements necessary for the operation of the grazing lease and may sublease the lands provided he has acquired prior Land Board approvals. The Board retains the right to lease the lands for other purposes such as timber harvest and mineral extraction.

2. The section relating to the Wyoming State Board of Land Commissioners on page 2-202 should also be deleted and replaced with this wording:

   The 87,185 acres of granted State land in the Sandy Area are leased to livestock operators for a ten (10) year term. The lessee is considered the guardian of the land, which is not open to public access unless an easement is

approved by the Wyoming State Land Board and recorded in the office of the Commissioner of Public Lands.

3. The listing of Public Lands Commissioner should be changed to Wyoming Commissioner of Public Lands and transferred from its position under Interested Organizations on page 9-16 to page 9-15 under State agencies.

4. These should be added under the Others category on page 9-18, assuring that they are given the opportunity to comment:

   Roberta Fullerton
   Outdoors Unlimited, Inc.
   P.O. Box 191
   Laramie, Wyoming 82070

   Robert Cullison, President
   Wyoming Timber Industry Association
   Manderson, Wyoming 82432

Thank you for the opportunity to comment.

Yours very truly,

A.E. KING
COMMISSIONER OF PUBLIC LANDS

BEL:cs

Appendix IX JUN 28 1978

MILLER, JR.
AND
GEOLOGIST

GEOLOGISTS
ROY M. BRECKENRIDGE
GARY B. GLASS
W. DAN HAUSEL
DAVID R. LAGESON
ALAN J. VER PLOEG

THE GEOLOGICAL SURVEY OF WYOMING
UNIVERSITY OF WYOMING
BOX 3008, UNIVERSITY STATION
LARAMIE, WYOMING 82071
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ROBERT S. HOUSTON, LARAMIE
BAYARD D. REA, CASPER

June 27, 1978

MEMORANDUM

TO: State Planning Coordinator
Wyoming State Clearinghouse
2320 Capitol Avenue
Cheyenne, WY 82002

FROM: Gary B. Glass, Deputy Director GBG
Geological Survey of Wyoming

SUBJECT: Sandy Grazing Environmental Statement
State Identifier No. 78-109D

Comments by Rodney H. De Bruin, Staff Geologist-Environmental

Chapter 2

The report states that there has never been any significant mining in the Sandy area. There is a claim in T.29N., R. 103W. and T.30N., R.103W. that is currently mining jade, and has produced over one million pounds of jade valued at nearly $40 million.

Although there may not be any structural traps for large oil or gas strikes in the Sandy area, there could be significant stratigraphic traps. For this reason, the oil and gas potential for the area shouldn't be discounted.

It is also stated that drilling activity in the area is expected to remain constant throughout the next 23 years. There are so many variables in oil and gas exploration that this statement is much too general.

Comment by Gary B. Glass, Deputy Director

At this time, we have no further comments to make on the ES for the Sandy Grazing area. If your office or another agency would like us to reexamine any part of this report for any specific purpose, please don't hesitate to ask.

Geology -- Interpreting the past to provide for the future

Riverside Livestock
Star Rt, Kemmerer, Wyo 83101
July 14 '78

U S Dept. of Interior
Bureau of Land Management
Rock Springs, Wyo

Gentlemen:

In response concerning the Sandy Grazing Environmental Statement currently being formulated, we submit the following facts & feelings:

At the time this country was settled, the government was doing all it could to entice & encourage people to stop in this barren flat called Wyoming. Homesteads of 160 acres were given with the promise of additional lands via Desert Land Entries, and along with the giving of those entries & homesteads in fee simple title they were granted to those people who stopped, built cabins, towns, battled sagebrush, severe winters, dust & incessant wind — what we feel is a thing approaching fee simple title to grazing rights on these government grounds.

These early settlers stayed in southwestern Wyo on the strength of their faith in governmental integrity to make good & keep good its promises. To survive here, we must have adequate grazing permits on government land.

32

Riverside Livestock to BLM
July 14 '78 Page two.

It is those who live adjacent to + use the Little Colorado Desert who should have the greatest rights, privileges + say on the management of this range. We resent "John Q. Public" in New York, Chicago, or even Salt Lake City dictating to us now we will be here + use this range. All Wyo land should be managed within the State.

Since before the Turn of the Century, until recently, Riverside Livestock has, by way of a "gentlemens agreement" enjoyed more or less a private allotment. It has been understood that this one gets this canyon, another gets that one, and we get the canyons adjacent to our ranch. This has worked well.

We feel that a private allotment adjacent to our ranch would serve our needs best. Following are just a few of the reasons:

1. The cows know the range - if extreme winter weather hazards set in the cows know their way home.

2. We know exactly what the feed situation will be each year before moving onto the range.

3. With most of our use being in Fall + winter we do not need a rotation grazing plan because the forage has had the summer to mature + seed out.

32

Riverside Livestock to BLM
July 14 '78 Page three

A few years ago the BLM asked us to convert the range we used for lambing grounds to cattle use. We agreed to do so with the assumption that we'd subsequently be allowed a fair conversion to cattle all around. To our frustration we have met with little success in our conversion to cattle due to confusion regarding the conversion rate.

Wild Horse Problems

After months of thinking out through the wild-a-horse plan, we are told the number of wild horses in our district alone still reaches the 6,000 head mark. We contend that most of a, most of these are not "wild" horses at all. They are merely privately owned run-aways or offspring of private run-aways. Now, the law prohibits us from rounding up or disposing of our own horses we've lost to the desert. Further frustration is inflicted when we are forced to share cattle grazing permits with these renegade horses at the expense of our cattle. Wild horses may be aesthetically enjoyed by horse lovers in Washington, N.Y., or Calif. who never see them much & never have to put up with them + the threat they pose to one's livelihood.

It isn't as if the horse were an endangered species. If all the "wild" horses in the world were wiped out, there would still be plenty of privately owned domestic horses to assure their continuation as a beautiful, useful, + abundant animal for the benefit of man.

32

Riverside Livestock to BLM
July 14 '78 Page four

And we would remind the "city horse lover" that often these herds are badly inbred + it is not kindness to let them continue to multiply + run wild as ways to romantic pictures in their minds, + doing so often results in causing other animals, namely cows + sheep, to suffer from lack of feed.

If these horses are to remain on the range let those who are so strong for them make & acquire + pay for the grazing rights + pay for management + control of these herds.

The romantic idea of a beautiful stallion galloping with the wind - wild, healthy, free is a secret yearning all of us identify with in our own human lives. But this romantic illusion is unrealistic + distorted. The reality we all need to face is that horses need care + breeding control. And livestock men, who are truly the greatest horse lovers of all are realistically concerned not only with the well-being of horses, but also with the providing of a livelihood for their families and food for the nation.

Respectfully,
Riverside Livestock Co.

By [signature]

32

Riverside Livestock Co.
Star Route, Kemmerer, Wyo. 83101
July 14, 1 78

U. S. Deot. of Interior
Bureau of Land Management
Rock Sorings District
Wyoming

Dear Sirs:

I would like to give my own oersonel feelings concerning the Sandy Grezing Environmental Statement being prepared et present.

After many yeers es e livestock man, it has been my observetion end experience that orivete ellotments ere better menaged by the operator end the Bureau of Land Menagement. Beceuse of this errangement there is an increase in forege end cettle do better end wildlife oooulation is mainteined end increesed. With improved forege cover, erosion is diminished.

Beceuse of the added control of the BLM end the edded interest that the Operator has in his ellotment, the needs of the other multi-use interests ere setisfied in their desires for heving the geme protected end the scenic beauty of the land preserved. Other operators have exoressed the desire for orivete ellotments also. We feel thet the BLM would have more success end e better relationship with the users of the oublic domain with the orivete ellotment plan.

I feel that the generel oublic hes hed distorted orooagende fed to them on the wild horses end that the BLM needs more oower end e definite olen for controlling horse numbers. I oersonally feel we can get elong without eny horses on the Sendy grezing unit, but if they ere to remain there, they need e definite, effective control orogram for the horses.

I sometimes feel like the oatriots thet founded our country felt when Englend was taxing them. I don't like this feeling and I eooreciete this ooortunity to submit these few statements.

Respectfully,

RIVERSIDE LIVESTOCK CO.

By [signature]
Bruce E. Jones

33

Box 90
Point of Rocks, WY 82942
July 18, 1978

Bureau of Land Management
District Office
P.O. Box 1869
Rock Springs, Wyoming 82901

RE: Sandy Grazing ES

ATTENTION: Team Leader

Gentlemen:

The Bureau of Land Management has written the Sandy Grazing Environmental Statement as a proposal for implementation of a new domestic livestock grazing management plan. While it should be recognized that much time and effort was involved in writing this proposal, I believe it should also be noted that not all of the purposes of the action as stated on page 3 of Chapter I would be achieved. In this letter, I would like to point out some of the more serious facts which are likely to prevent or at least delay the implementation of this management plan.

1. There was very little consultation between the BLM and the livestock owners. As a result, a plan was conceived which was totally unsatisfactory to the same people it was intended to benefit. Ranchers were given little credit for the fact that for the past 30 years they have managed these lands completely on their own and have long ago learned that they are hurting themselves more than anyone if careful range conservation is not practiced. It has also been pointed out by several livestock owners that the terms 'improved management' as carried out by the BLM and the traditional 'season-long grazing' are frequently one and the same. In the case of season-long grazing, it is simply the livestock operator making the decisions to rotate the herds rather than the BLM.

2. This leads to a second point which should be brought out: the climate of the sandy area. It would appear that in an area such as this, where rainfall is low and unpredictable, it would be logical to follow a grazing system where rotation dates were more flexible than those suggested by the proposed plan. This would permit grazing in an area to continue only so long as the site wasn't degraded. This time period could vary markedly from one year to the next depending on rainfall and subsequent vegetative production.

3. An increased number of water developments would appear to be a good management practice, but when viewed with regard to the wildlife of the area it could be quite detrimental. First, fencing of watering sites and capping when not in use by livestock would greatly limit any advantages an increased number of water sites would present to wildlife. Also, the location of these sites is frequently on prime winter habitat. The competition due to increased summer usage by cattle and sheep would decrease forage production and result in an increased winter kill of big game species during even a

33

Bureau of Land Management
Page 2
July 18, 1978

moderate winter. Non big game species such as sage grouse and waterfowl, would also experience a decrease in numbers due to trampling by livestock.

4. There are 536 miles of new fenceline to be built according to the new proposal. This much fenceline would result in negative impacts from nearly every aspect. Visual resources would decline, especially for that segment of the public which values the wide open spaces. There would also be an impact on those who participate in outdoor recreation activities, as the fences would be a barrier to travel. Some weight loss could be expected to occur with the livestock until they became accustomed to the fences. The most serious impact would be with the big game species. Fencelines interfere with migration patterns and do not allow for the freedom of movement with which these animals are familiar. Antelope, which historically are not accustomed to having to cope with fences, would be the most severely affected.

The main objective with any land use management plan should be to achieve a status of multiple use. My main criticism of the Sandy Grazing E.S. is that it fails to do this. Instead it puts increased limitations on nearly every aspect of usage of the land. I do not believe that, with the decreasing quantity of land resources this country holds, this type of land management can be justified.

Sincerely,

Jay Call

Jay Call
Soil Scientist

JC/nal

34

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO:

L7621 (RMRO)PC

JUL 26 1978

Memorandum

To: Team Leader, Sandy Environmental Statement, Bureau of Land Management, Rock Springs, Wyoming

From: Regional Director, Rocky Mountain Region

Subject: Review of draft environmental statement for the proposed Domestic Livestock Grazing Management Program for the Sandy Area, Wyoming

Per telecon July 14 between Ron Herds of your office and Gayle Smith of this office, we are by this memorandum concurring with comments forwarded to you July 10 from Acting Superintendent Olsen on the subject draft environmental statement.

Glen T. Bean

Glen T. Bean

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

34

United States Department of the Interior
NATIONAL PARK SERVICE
Fossil Butte National Monument
P.O. Box 545
Kemmerer, Wyoming 83101

IN REPLY REFER TO:
A94-1

July 10, 1978

Mr. Dean F. Foragran
Team Leader
Bureau of Land Management
Sandy Environmental Statement
P. O. Box 1869
Rock Springs, WY 82901

Dear Mr. Foragran:

We support the Proposed Domestic Livestock Grazing Management Program for the Sandy Area. We have reviewed the environmental statement and recognize the tremendous amount of work required to present this proposal. We also recognize the difficulty in presenting a plan that is equitable with ranching, wildlife and recreation use on a continued basis.

We support the use of the five basic types of grazing treatments as determined necessary to manage the various grazing allotments. We favor the three-strand wildlife fence. We recommend that fencing be constructed only where required and that it is located and/or placed to facilitate wildlife movement and recreation users.

Sincerely,

David L. Olson

DAVID L. OLSON
Acting Superintendent

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. Box 2440, Casper, Wyoming 82602

July 21, 1978

Dean F. Forsgren
Bureau of Land Management
Sandy ES Team Leader
P. O. Box 1869
Rock Springs, Wyoming 82901

Subject: Draft Sandy Grazing Environmental Statement

Following are our comments on the Sandy Grazing EIS draft as requested by BLMs undated letter from Neil F. Morck, District Manager, Rock Springs, Wyoming.

1. Throughout the draft EIS it is apparent that it is written from the consumer trophic level, and not enough attention given to the effect on soils and vegetation. What would the effects be from the proposed action or the different alternatives have on the basic resources?

   The area needs to be inventoried and analysed from an ecological and total ecosystem approach. It needs to show relationships between primary producer, consumers, and other trophic levels. Range condition as used throughout the statement refers to forage for animal use. It does not reflect what the ecological impacts are to the basic resource "vegetation." Present vegetation is shown by ten major vegetation types, but there is no information on what successional stages these vegetation communities may be when compared to the potential for the sites. For instance, it is stated on page 2-17 that Big sagebrush-grass is the dominate subtype covering approximately 90% of the total Sandy area. Also, that shrubs vary between 40% to 70%, grasses 30% to 60% and a trace to 10% of forbs on this area. The question is, what successional stage is this plant community in compared to the potential? Should there be more grasses, less shrubs, or what? Range improvement is stressed throughout the statement. What then happens to this plant community? More shrubs, less grass; more desirable shrubs and grasses; or less desirable, or what?

2. Is there a need for this size of document? A separate resource base document might eliminate much of the bulk from the environmental statement.

3. Soils data and interpretation are very sketchy. Capabilities of soils to produce native plant communities is not shown.

4. Range condition as used for the different animals is very confusing. Page 2-17 states vegetation is "90% sagebrush-grass," what then makes areas within this community good, fair, or poor range condition for cattle and horses and different areas for sheep? If there is a difference in range sites and plant communities within this area, it should be shown.

5. Maps on range condition and on apparent trend for wildlife could be eliminated and only the habitat maps for wildlife shown. There is a lot of duplication between these maps.

6. Table 2-37. What determined the desired numbers of big game animals? Was it vegetation or a change in species composition?

7. Table 3-16, Footnote 2 - "SCS's Technician's Guide to Range Sites, and Range Condition with Initial Stocking Rates" does not show maximum production on each range site. Stocking rates shown in the guides are suggested initial rates. They are effected by several factors such as climatic fluctuation, seasonal use, kind of management, etc. Also, because of the above factors, a table with these kinds of projection has little validity. Flexibility has to be built into the grazing management system.

8. Page 3-4 and 3-8. The statement "sheet erosion would continue to reduce water quality and impair aquatic habitat and cultural values" is misleading. Sediment affects water quality. Only a small amount of sheet or rill erosion ever reaches a water body. Some sediment is needed to feed the aquatic ecosystem. Accelerated erosion and consisted sedimentation is particularly adverse to the system.

9. Page 1-8, right column - B/C study was conducted and results shown. A good table showing benefical items and cost items would be helpful. This report shortchanges economics. Are costs of mitigation and the benefits of improved fisheries habitat evaluated in dollars in the B/C study?

10. Under proposed action as well as alternatives to proposal, ecological effects on the basic resources (soils, vegetation) are not clear. Range condition improvement is discussed but not explained as to what happens to vegetation. Less shrubs, more grass, or more desirable plants, or what will happen due to plant succession which will occur based on the different management strategies.

In summary, there has been a lot of time and effort put into the statement to collect data, but we feel interpretation and presentation of the data is confusing and very subjective. Flexibility and management need to be stressed more and less emphasis placed on AUMs or pounds of forage.

Frank S. Dickson
State Conservationist

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FOREST SERVICE
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JUL 19 1978

Mr. Dean F. Forsgren
Bureau of Land Management
Sandy ES Team Leader
P.O. Box 1869
Rock Springs, Wyoming 82901

Dear Mr. Forsgren:

We have reviewed the draft environmental statement for the proposed Livestock Grazing Management in the Sandy Area, Wyoming (1792(412)WH01).

Generally, we found the statement to be well done and very comprehensive in its treatment of Sandy Area's resources. We feel the document should describe more fully the interagency coordination between BLM and FS in the matter of livestock use, and it should explain the current Forest Service-Bureau of Land Management coordination situation. For example, what are the causes where cattle are turned on to National Forest allotments from the BLM? What is the status of management on these Forest Service allotments, and are there any present coordination measures being taken or needed? Chapter 3 - Environmental Impacts of the Proposed Action should address how the proposed action will affect coordination between our agencies in these adjacent allotment situations.

The 3 and 4 pasture rest rotation systems should be altered under treatment A, moderate use. Within a short time after livestock are allowed to drift into the next unit, all livestock should be cleared from the unit proposed for season-long use. This lightens the impact along streams and on the meadow type for which BLM has indicated a concern. It also allows for regrowth to improve plant vigor or provide late season feed for wildlife.

The impact of allocating all increased forage production use to livestock appears to be at the expense of wildlife. It would seem appropriate to allocate a portion of the increased AUM's to big game and other wildlife use.

One of the stated purposes of the proposed action (see summary page iii(2)) is to increase stream channel stability on approximately 300 miles of FS streams to improve fish habitat. However, the text of the

DES indicates an overall reduction in fishery due to damage to stream bottoms by grazing livestock. Therefore, it seems highly unlikely that the stated purposes concerning stream channel stability would be accomplished by the selected alternative. Our Ranger Districts at Pinedale and Big Piney will be able to supply you with management status of FS allotments adjacent to the Sandy Area.

We appreciate the opportunity to review and comment on this draft environmental statement.

Sincerely,

R. MAX PETERSON
Deputy Chief

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July 21, 1978

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Sand E.S. Team Leader
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Dear Mr. Forsgren:

Thank you for the opportunity to review and comment on the Draft Environmental Statement for the Proposed Domestic Livestock Grazing Management Program for the Sandy Area. The American Horse Protection Association has considered carefully those parts of the program which would directly impact wild horses.

While we recognize that the primary purpose of this statement is to present an overview of a livestock grazing program we would like to point out that the Bureau of Land Management cannot hide the true impact of the program on wild horses by relegating their removal to a separate unit management plan. Merely discussing the program's impact on the horses remaining after a roundup designed to effectuate cattle grazing is not sufficient. If the removal of wild horses or any other wild animal is part and parcel of the grazing program that removal cannot be used as a premise on which the ES is based. The removal, its impacts and alternative proposals must either be incorporated in the main ES or evaluated in light of alternative studies that do not presume that horses will be removed. The BLM has already lost one lawsuit involving a factual situation striking similar to that presented here -- an EA and roundup in the Salmon District of Idaho. We will be happy to provide you with a copy of the Court's opinion if you so desire.

Based on what sparse information was contained in the draft statement, the removal of over 50% of the wild horses from the Sandy Area is not necessary. Nearly 60,000 AUM's -- almost half of the authorized livestock use total -- current fall into the nonuse total (Table 1-1). Even assuming that the horse population estimate in Table

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2-57 is correct (since no information on survey techniques was included that assumption is unwarranted), the entire current horse population could be maintained by reserving for it only 20% of the unused livestock AUM's.

Focusing particularly on the four grazing systems in which the wild horses are concentrated (Little Colorado, Red Desert, Bush Rim and Continental Creek), it is still apparent that the habitat can support the total existing wild horse population. For example, the planned production for Little Colorado is 1800 AUM's for horses. The estimated current use is over 6000 AUM's. Livestock forage production is more 40,000 AUM's, and the program goal is to increase this figure by nearly 22,000 AUM's. (Table 1-8). Maintenance of the current horse population would absorb at most only 10% of the current livestock forage production, and this figure would decrease if the management program is successful. The true effect would probably be even less because horses and livestock diets do not completely overlap and because horses will graze farther from watering holes than will cattle or sheep, thus using forage that is unavailable to livestock.

For these reasons, the Draft Statement should be revised to include a proposal for management of the Sandy Area with a horse population of at least the current level. The land could easily support herds of this size and still have plenty of forage left for the livestock that also use the range, if the land were properly managed. We would also like additional information, especially concerning the wild horse population surveys, how optimum herd size was determined, and how the proposed removals are to be accomplished. In this regard we would be appreciate your sending us a copy of the draft wild horses unit management plans.

Very truly yours,

McCANDLESS & BARRETT

By: Russell J. Garman
Russell J. Garman
Attorneys for American Horse Protection Association, Inc.

RJG:mk

GLOSSARY OF TERMS

Sources for this glossary include A Glossary of Terms Used in Range Management, Society for Range Management, 1974; Glossary of Soil Science Terms, Soil Science Society of America, 1975; and Bureau of Land Management manuals.

ACTUAL USE. See USE, ACTUAL.

ADJUDICATION. Adjudication of grazing privileges is the determination of the qualifications for grazing privileges of the base properties, land or water, offered in support of applications for grazing licenses or permits in a range unit or area, and the subsequent equitable apportionment among the applicants of the forage production within the proper grazing season and capacity of the particular unit or area of Federal range, and acceptance by the applicants of the grazing privileges based upon the apportionment or its substantiation in a decision by an examiner or the Board of Land Appeals upon appeal.

AERATION, SOILS. The process by which air in the soils is replaced by air from the atmosphere.

ALKALINE SOILS. Soils having a pH greater than 7.0. In the Sandy area, soils have a high pH (greater than 8.5) which limits management potential.

ALLOTMENT. An area of land where one or more individuals graze their livestock. It generally consists of national resource lands but may include parcels of private or state owned lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of several pastures. In the Sandy area, an allotment may be in one geographical area and grazed under one grazing system, or it may include separate geographical tracts (use areas) which are treated as a single management unit but grazed under separate grazing systems.

ALLOTMENT MANAGEMENT PLAN (AMP). A documented program for a livestock operation on the public lands. It prescribes how the livestock operations will meet sustained yield, multiple-use, economic, and other needs and objectives for the public lands as determined through land-use planning; the type, location, ownership, and general specifications for range improvements that would be installed and maintained; and other provisions related to livestock grazing and other public land management objectives.

ALLOWABLE USE. As used in this document, allowable use refers to the total AUMs of privileges that a permittee may activate for grazing purposes at any given time.

ANIMAL UNIT MONTH (AUM). The amount of forage one cow, five sheep, about fifteen pronghorn antelope, five deer, one horse, or one moose eat(s) in one month.

ALTITHERMAL. A period of extreme aridity which caused a hiatus in the cultural history of Wyoming as bison herds moved out of the area and water sources dried up.

ARCHEOLOGICAL RESOURCES. The physical evidence of past human occupation which can be used to reconstruct the culture of past peoples. The archeological record is usually expressed in the form of districts, sites, structures, and objects.

ARCHEOLOGICAL SITE. A physical location where human activities or events transpired. The location of an event, activity building, structure, or object. The determination of the significance of a site is essentially a value judgment by a professional archeologist or historian.

AUM. See ANIMAL UNIT MONTH.

AVAILABLE NUTRIENT. The amount of nutrient (nitrogen, potassium, etc.) which can be readily absorbed by plant roots.

AVAILABLE WATER. The proportion of water in the soil that can be absorbed by plant roots.

B/C RATIO. This ratio measures the change in benefits associated with a change in costs. Total benefits are maximized when the benefit-cost ratio equals one. A ratio that is greater than one indicates that output should be expanded; a ratio of less than one indicates output should be reduced.

BADLANDS. Rough, broken lands devoid of vegetation; a nonsoil area.

BASE PROPERTY. Property used for the support of the livestock for which a grazing privilege on national resource lands is sought. It is the basis for computing the extent of a license or permit.

BREEDING COMPLEX. The 2-mile radius around a sage grouse strutting ground.

BROWSE. As a verb, to consume, or feed on a plant; as a noun, the tender shoots, twigs, and leaves of trees and shrubs often used as food by cattle, deer, elk, and other animals.

CACHE. A location where an animal has hidden or buried food.

CALCAREOUS SOIL. Soil containing free calcium carbonate (lime) that effervesces when treated with weak acid.

CANOPY. The percent of vertical overstory per unit area for trees and shrubs alone. (Synonymous with CROWN COVER and CANOPY INTERCEPT).

CHANNERY. Flat, thin pieces of sandstone, shale or siltstone up to six inches to one axis.

CHECKERBOARD LANDS. Alternating sections of Federal lands and private or State lands for 20 miles on either side on the Union Pacific railroad in southwestern Wyoming. This pattern of land ownership looks like a checkerboard on maps using different colors for different land status. This pattern is especially clear in Sweetwater, Lincoln, and Uinta Counties of Wyoming.

CLASS OF LIVESTOCK. Kinds of domestic livestock grazing on a range: cattle, horses, sheep, goats, or a combination of these. May be broken down to greater detail, such as cows with calves, yearlings, steers, ewes, ewes with lambs, lambs, etc.

CLASS I QUALIFICATIONS. Grazing privileges established on the basis of use of the Federal range during the priority period. For the Rock Springs District this period is 1929 through 1934.

CLAY. Soil particles up to 0.002 millimeter in size.

COLIFORM. A group of bacteria used as an indicator of sanitary quality in water. The total coliform group is an indicator of sanitary significance because the organisms are normally present in large numbers in the intestinal tracts of humans and other warm-blooded animals.

COLLUVIUM. Poorly sorted material at the base of strong slopes that have been moved by gravity, frost action, soil creep, or local wash.

COMPLIANCE STATEMENT, 106. Under the Historic Preservation Act of 1966, the Advisory Council on Historic Preservation must be given an opportunity to comment with regard to any action which may affect any site on or eligible for inclusion on the National Register. If the undertaking causes a change in the quality of the character of the site, then the Advisory Council and State Liaison Officer would consult with the agency to either remove or mitigate the effect. Also referred to as 106 STATEMENT.

COMPOSITION. The relative proportions of various plant species of the total live vegetative cover on a given area. It may be expressed in terms of cover, density, weight, etc.

COOPERATIVE AGREEMENT. An agreement issued by BLM in conjunction with the construction of a project on public lands: Both the licensee and BLM have an interest in the project with the government retaining ownership of the project. This agreement also spells out who will maintain the project.

COVER. See GROUND and VEGETAL COVER.

CRUCIAL WILDLIFE HABITAT. That portion of the living area of a wildlife species that is essential to the survival and perpetuation of the species either as individuals or as a population.

CYCLE. See GRAZING CYCLE.

DEBRITAGE. Waste flakes and cores discarded during the production of stone implements.

DECREASER SPECIES. Plants of a range site's original vegetation that will decrease in numbers with the continued overuse.

DENSITY. The number of individuals per unit area; refers to the relative closeness of individuals; incidence of occurrence.

DESIRABLE PLANTS. Plants which are palatable and productive forage species, often are dominanat under or near climax conditions, are long lived, and have deep fibrous roots to protect the watershed against erosion. This category includes the important key species (grasses, forbs, and browse) which are to be maintained or increased by intensive livestock management.

DETRITUS. Organic debris, or fragments that have resulted from the disintegration of living tissue or wastes.

ECOLOGICAL RANGE CONDITION. An expression of the current vegetative conditions on an ecological range site in terms of its relationship to the potential climax plant community for that site. Ecological range site classes are: Poor, 0-25% of present vegetation is climax for the site; Good, 50-75% of the present vegetation climax for the site; Excellent, 75-100% of the present vegetation is climax for the site.

EGRESS. The right of going or coming out of lands.

EROSION. The wearing away of land surface by wind, running water, and other natural agents.

EROSION CONDITION CLASSES. A classification system for soil erosion which allows a site to be ranked on a scale of 0-100, in increments of 20 points. Value classes are: 0-20= stable; 21-40= slight; 41-60= moderate; 61-80= critical; 81-100= severe. The terms used for value classes are largely self-explanatory.

EXCHANGE CAPACITY. The total amount of potential holding ability of a soil for nutrient ions.

FAIR RANGE CONDITION. Composition is 15-39 percent of desirable and intermediate species with five percent or more made up of desirable species. The soil surface factor (SSF) is less than 60. Also, those ecosystems, where the composition comprises 60 percent or more of intermediate species and less than five percent desirable species are present, will be rated "fair condition" when the SSF is less than 60.

FERAL. Formerly domesticated animals or offspring of these animals which exist wild.

FIRST CYCLE. The initial sequence of treatments in a grazing system for any pasture; for example, Treatments A, B, and C of a three-pasture rest-rotation system would be applied over a 3-year period to a specific pasture. Repetition of this sequence would represent the SECOND CYCLE.

FOOD RESERVES. Carbohydrates stored in plant parts and used to maintain the dormant plant and begin growth the following season. Cf. ROOT RESERVES.

FOLSOM. A Paleo-Indian culture whcih is characterized by fluted Folsom points and an emphasis on the hunting of the extinct Bison antiquis.

FORAGE COMPETITIVE. Forage that is utilized to some extent by two or more species of animals. Usually referred to as competition between livestock and wildlife.

FORAGE, NONCOMPETITIVE. Forage that is utilized by one species of animal and not by another. Usually referred to as wildlife forage not utilized by livestock.

FORAGE PRODUCTION. The weight of forage that is produced within a designated period of time on a given area.

FORB. Any herbaceous plant other than those in the Gramineae (or Poaceae), Cyperaceae and Juncacea families.

GEOLOGIC EROSION. Wearing away of the earth's surface by water, ice, or other natural elements under natural environmental conditions of climate, vegetation, etc., undisturbed by man. Synonymous with NATURAL EROSION.

GESTATION PERIOD. The time required for young to develop in the mother animal's body from conception to birth; pregnancy.

GOOD RANGE CONDITION. Composition is 40 percent or more of both desirable and intermediate species with at least 20 percent made up of desirable species. The soil surface factor (SSF) is less than 40.

GRASS. A member of the family Gramineae (Poaceae).

GRASSLIKE PLANT. A plant of the Cyperaceae or Juncaceae which vegetatively resembles a true grass of the Gramineae family.

GRAZING CAPACITY. The total AUMs of forage available from a tract of land during a given period of time; the maximum rate of livestock stocking possible without incurring damage to vegetation or related resources (soil, water, etc.). Both of the aforementioned take into consideration the proper use factor of each plant species in determining total AVAILABLE FORAGE, which is less than the forage produced.

GRAZING CYCLE. The period of time required to apply all treatments of a grazing system to a pasture. For example, a five-pasture rest-rotation system would require five years to apply all treatments to a pasture.

GRAZING DISTRICT. An administrative subdivision of the rangelands under the jurisdiction of the Bureau of Land Management, established pursuant to the Taylor Grazing Act of June 28, 1934. Section 3 lands are those public lands within a grazing district boundary pursuant to Section 3 of the Act.

GRAZING SYSTEM. A systematic sequence of grazing use and rest of an allotment to reach identified multiple use objectives by improving the quality and quantity of the vegetation.

GROWING SEASON. That portion of the year when temperature and moisture are usually favorable for plant growth. This normally occurs from May 1 to August 25 for the major livestock forage species in the Sandy area.

GROUND COVER/PERCENT GROUND COVER. The area covered by the combined parts of plants (basal area of grasses and forbs and canopy of shrubs), mulch, and nonorganic material (rocks). This is expressed as a percent.

HABITAT. The total environmental conditions of a specific place or area that is occupied by an organism, a population, or a community. Some elements of habitat are food, cover, water, and space.

HEADCUTTING. The action of surface water undercutting soft substrata at the head of a gully. The material above then falls into the gully and is washed away. In this manner the headcut moves upstream.

HERDER. One who tends livestock on a range. Usually applied to the man herding a band of sheep or goats.

HISTORICAL RESOURCES. The physical remains of significance human activities. They are the same as archeological resources with the addition of written material and locations where documented historical events took place although no physical evidence remains.

HOME RANGE. Seasonal areas of use occupied by several bands of horses which graze in close prozimity to each other and migrate together. These areas are from 18 to 60 square miles in size in the Sandy area.

INCREASER SPECIES. Plants of a range site's original vegetation that will increase in numbers, at least for a time, when the site is overused.

INFILTRATION. Water entering the ground water system through the land surface.

INFILTRATION RATE. The maximum rate at which water can move into a soil.

INGRESS. The right of entrance or access to lands.

INTERMEDIATE PLANTS. Plants of secondary importance in the climax condition. They replace the desirable plants as condition deteriorates, and replace the least desirables as condition improves. They may be less desirable to grazing animals or be more resistant to grazing use.

INVADER SPECIES. Plants that were absent, or present in minute numbers, in undisturbed portions of a specific range site's original vegetation, but become more numerous when the site is disturbed or continually overused.

KEY FORAGE SPECIES. Relatively or potentially abundant, endures moderately close grazing, and serves as an indicator of changes occurring in the vegetational complex. This species is an important vegetal component that, if overused, will have significant effect on watershed condition, grazing capacity, or other resource values. Other forage species having growth requirements equal to or less than the key species will be maintained by the rest from grazing.

LAMINAR FLOW. A flow of water or other fluid that is not mixed with neighboring layers of fluid.

LEAST DESIRABLE PLANTS. Plants that are definately the poorer species in a type or community, and consist principally of invaders, noxious, or low value forage plants.

LICENSE. An authorization which permits the grazing of a specified number and class of livestock on a designated area of national resource lands for a period of time.

LICENSED ACTIVE USE. See USE, LICENSED ACTIVE.

LITTER. The primary layer of bulky, coarse, largely undecayed herbage left on the ground.

LIVESTOCK GRAZING CAPACITIES. See GRAZING CAPACITY.

LLANO. The earliest known culture in the New World. It is characterized by the presence of Clovis points and a big game hunting lifestyle.

MARGINAL USE/NONUSE. Areas not used as native environment by wildlife but where they may be seen occasionally. Also, areas not used by livestock or wild horses because they are located too far from available water sources or where terrain is too steep thus prohibiting use.

MIDDLE PREHISTORIC PERIOD. The time during which the greatest bulk of the prehistoric cultural activity took place in the study area. It is characterized by a hunting and gathering culture involving flat, grinding slabs and several types of projectile points.

MULCH. Dead plant material on the soil's surface; may also include plastic, paper, asphalt, cement, litter, wood, straw, etc.

NATIONAL REGISTER OF HISTORIC PLACES. Established by the Historic Preservation Act of 1966. The Register is a listing of archeological, historical, and architectural sites nominated for their local, state, or national significance by the State and Federal agencies and approved by the Register staff.

NATIONAL RESOURCE LANDS (NRL). Historically, the public domain administered by the Bureau of Land Management for the purpose of providing forage, wood products, and minerals for public users. The uses and resources of these public lands have been expanded in recent years to provide open space, recreation resources, protection of cultural resources, and other commodities.

NONUSE, REGULAR. The authorization by license to refrain from placing livestock on the range without loss of preference for future consideration in livestock use of national resource lands, expressed in AUMs.

NONUSE, SUSPENDED. The difference between the grazing privileges and the present allowable stocking rate of the public lands.

PALYNOLOGICAL PROFILE. See POLLEN SAMPLES.

PARTURITION. The process of giving birth; calving period.

PARALLEL BASE LAND. Land of the same character, interspersed with, and grazed at the same time as the Federal range on which grazing privileges may be granted.

PERCENT COMPOSITION. The frequency a plant occurs within a given area expressed as a percent. Also see COMPOSITION.

pH. The negative logarithm of the hydrogen ion concentration. A low pH indicates an acid, and a high pH indicates an alkaline substance. A pH of 7.0 is considered neutral.

PHENOLOGY. The study of periodic biological phenomena such as flowering, seeding, etc., especially as related to climate.

PLANO PERIOD. The time between the end of the Folsom Culture and the beginning of the Altithermal during which numerous localized subphases of projectile points were developed, such as the Midland, Agate Basin, Hell Gap, Albert, Cody, Frederick, and Lusk.

PLATY. Consisting of soil aggregates that are developed predominantly along the horizontal axes; laminated; flaky.

POLLEN SAMPLES. Samples taken to determine the past climate of an archeological site from the paleopollen present in the soil. Pollen indicates what kind of plants were growing at the time, and thus would indicate what kind of climate was present to allow these plants to grow. A number of samples usually are taken from the site in a vertical profile known as a PALYNOLOGICAL PROFILE.

POOR RANGE CONDITION. Composition less than fifteen percent desirable and intermediate species. The soil surface factor (SSF) is more than 60. Plant lists are prepared for each BLM District classifying plants as desirable, intermediate, and least desirable for each class of livestock (cattle, sheep and horses).

PREDATOR. An animal that preys on other animals.

PROPER USE FACTOR (PUF). The degree of use that may be made of individual plants in a vegetation type's or plant community's current year growth which, if continued, will either maintain or improve the range condition. Plant growth requirements and animal grazing preference are considered in setting Proper Use Factors.

QUALIFICATIONS, CLASS I. grazing privileges established on the basis of use of the Federal range during the priority period. For the Rock Springs District this period is 1929 through 1934.

RANGE CONDITION. The current status and estimated future improvement or deterioration of the vegetation as it applies to its forage potential for

a particular grazing animal. It is based on the percent of desirable vegetal species available for that animal and on the area's erosion condition. Cf. GOOD, FAIR, AND POOR RANGE CONDITION.

RANGE SITE. A distinctive kind of rangeland which under existing conditions has the potential to support a native plant community typified by an association of species different from that of other sites. Significant differences in the kind or proportion of plant species differentiate one site from another. Soils, slope, and moisture regime are amoung the important elements that differentiate range sites. See APPENDIX 21.

RANGE IMPROVEMENT. A structure or practice that increases forage production, improves watershed and range conditions, or facilitates managements of the livestock grazing thereon.

RANGE IMPROVEMENT FUND. Part of the grazing fees set aside for the construction and maintenance of range improvement projects.

RANGE SUITABILITY. The adaptability of a range to grazing by livestock and/or big game.

RANGE TREND, APPARENT. The direction or apparent change in range condition class. Trend is rated as being in an upward, downward, or static position.

RANGELAND (RANGE). Land on which native vegetation is predominately grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing use.

REACH. A portion of a given stream usually of a specified length.

REDD. The area of stream bed dug out by a female trout where she buries her eggs after spawning.

RESERVATION, COMPETITIVE. Forage allowance in AUMs for vegetation types that are used by both livestock and wildlife species; made in accordance with overlapping diets of species.

RESERVATION, NONCOMPETITIVE. Forage allowance in AUMs for vegetation types that are used by wildlife, but not by livestock.

RESERVOIR. An artificial lake or pond in which water is collected and stored for range management uses.

RHIZOME. A horizontal underground stem which usually sends roots and aboveground shoots from the nodes.

RIPARIAN. As used here, riparian refers to the areas adjacent to streams and other bodies of water, wet meadows, springs, wells, and other waters.

ROOT RESERVES. Carbohydrates stored in underground plant parts that are used to maintain the dormant plant and begin growth the following season. Applies mainly to grasses, grasslike plants, and forbs.

ROTATION GRAZING. System of pasture utilization embracing short periods of heavy stocking followed by periods of rest for herbage recovery during the same season.

RUNOFF. The total stream discharge of water, including both surface and subsurface flow, usually expressed in acre-feet of water yield.

SACRIFICE AREA OR SITE. A portion of the range that is intentionally overgrazed to obtain efficient overall use of the management area.

SALINE SOIL. A soil containing enough soluble salts to impair management potential.

SAND. Soil particles between 0.05 and 2.00 millimeters in size.

SANDY RANGE SITE. The soil mapping units developed for the Sandy area were grouped into Sandy Range Sites designated RS1, RS2, etc. See APPENDIX 21-2. The percentages of ecological range sites within each Sandy Range Site were determined in order to develop the potential productivity estimates for the Sandy Range Sites. The Sandy Range Sites were further correlated to the vegetation types from the 1964-65 ocular reconnaissance survey in order to provide a bridge for utilization of the more detailed and specific data available for ecological range sites in evaluation and prediction of potential productivity of the vegetation resources.

SEASON-LONG USE. When the type of management is such that the entire specified grazing area (allotment or pasture) is available for grazing by livestock throughout the growing season. Also see GROWING SEASON.

SEASON OF USE. The times of the year when domestic animals would be allowed to graze on a specific unit of range, as designated by license.

SECTION 4 PERMIT. A permit issued by BLM under Section 4 of the Taylor Grazing Act to construct a range improvement project on public lands. The licensee has sole interest in the project including maintenance.

SELECTIVE GRAZING. The grazing of certain plant species on the range to the exclusion of others.

SHEET EROSION. The removal of a fairly uniform layer of soil from the land surface by runoff water.

SHRUB. A plant that has persistant, woody stems and a relatively low growth habit, and that generally produces several basal shoots instead of a single bole. It differs from a tree by its low stature and nonarborescent form.

SILT. Soil particles between 0.05 and 0.002 of a millimeter in size.

SLOPE. A slant or incline of the land surface, measured in degrees from the horizontal, or in percent (defined as the number of feet or meters change in elevation per 100 of the same units of horizontal distance) and characterized by direction (exposure).

SOIL ASSOCIATION. A group of defined and named taxonomic soil units occurring together in an individual and characteristic pattern over a geographic area.

SOIL SURFACE FACTOR (SSF). The SSF is an expression of current erosion activity. Seven categories of surface features are considered in the examination of the area. Both wind and water are considered for each category. The categories are: soil movement, surface litter, surface rock, pedestaling, rills, flow patterns, and gullies. Numerical values are assigned to each category and are totaled to determine the SSF. This value determines the erosion condition class of the area. Cf. erosion condition.

SPATIAL CONTEXT. The horizontal and/or vertical location of artifacts within an archeological site.

STOLON. A horizontal stem which grows along the soil surface and roots at the nodes.

STORM, 10 YEAR. Volume and intensity of a storm that could be expected to happen once in 10 years.

TRAILING USE. Controlled movement of livestock through or across public lands (NRL), usually from one grazing area to another (whether private, Forest Service, or other NRL). The livestock graze as they are trailed.

TRAILING, NATURAL. Habitual movement of livestock, wild horses or wildlife along the same line or path.

TRESPASS. The grazing of livestock on a range area without proper authority and resulting from a willful or negligent act. Trespass includes any or all of the following: (1) Grazing an improper number of livestock; (2) in the wrong areas of use, and (3) at an unauthorized time of year.

TUFFACEOUS. Containing volcanic fragments, generally smaller than 4 millimeters in diameter.

UNGULATE. A hoofed animal.

USE, ACTUAL. As used in this document, actual use is that portion of the grazing privileges taken under active licensed use. It was used to clarify the difference between active and nonuse, which are both licensed.

USE, LICENSED ACTIVE. The grazing use in AUMs authorized by license for domestic livestock on national resource land.

VEGETAL COVER. The percent of a land surface covered by the basal portion of the indicated grass or forb, any live vegetative portion of the indicated shrub, or any portion under 20 feet.

VEGETATION TYPE. A term used to differentiate vegetation. It generally refers to the species or various combinations of species which have similar stature, morphology, and appearance and dominate or appear to dominate a site, giving it a common appearance.

VEGETATION SUBTYPE. A subdivision of a vegetation type which generally indicates an aspect to the viewer of either a single dominant species, or dominant species, similar in appearance (i.e., vegetaiton type = Conifer;

vegetation subtype = lodgepole pine; vegetation type = Grass; vegetation subtypes = shortgrass, tall grass, etc.).

VISUAL CONTRAST RATING. A method for measuring the visibility of a change or modification in any landscape feature.

WET MEADOW. A meadow where the surface remains wet or moist throughout the summer, usually characterized by the presence of sedges or rushes.

WILDLIFE RESERVATION. The amount of competitive forage that must be set aside from the grazing capacity of a range to satisfy the needs of wildlife.

XERIC CONDITIONS. Needing only a small amount of moisture to grow.

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